



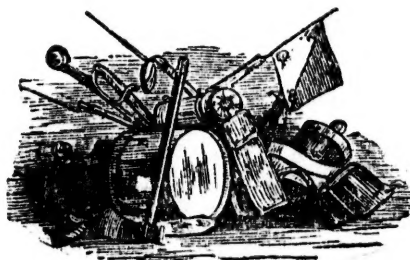
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THE
CANADIAN
Volunteers' Hand-Book:

A COMPENDIUM OF
MILITARY FACTS AND SUGGESTIONS ADAPTED
TO FIELD SERVICE.

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PREFACE.

THE thoroughly independent and honourable course of Great Britain in reference to the internecine war now devastating the American continent, has raised up a host of enemies to the British flag in the Federal and Confederate States. The Northern and Eastern States condemn what they call the inconsistency of England in withholding her cordial sympathy in behalf of an earnest endeavour to crush out Slavery in the South;—the Southerners are astounded and annoyed that England has not recognized the omnipotence of King Cotton and proceeded to open the ports of Charleston, Savannah, New Orleans, &c. These men cannot comprehend that public virtue which prefers heavy commercial loss and immense domestic sacrifices to a departure from moral obligations and a settled policy. Thus, we have no friends among the belligerents, and can entertain little doubt that the menaces of the North, *that when this war is over, they will turn their glorious arms towards Great Britain, and chastise her neutrality,* will be fulfilled. *An invasion and appropriation of the Canadas will be the first hostile step.*

Hence the necessity for preparation in Canada. It is just possible that, worn out and impoverished, disgusted with war, and apprehensive of further calamities, the Federals will be rather disposed to return to their ordinary peaceful occupations than confront fresh,

disciplined armies defending the territorial possessions of a beloved monarch. But we have no right to calculate on this forbearance. Every anticipation formed of the North and South has, hitherto, been falsified by events: we may be equally erroneous in indulging favourable conjectures, for it is as probable that those who have been engaged in the war may have acquired an insatiable passion for military enterprise, as that they will convert their swords into ploughshares and pruning-hooks. The Ancients always kept themselves prepared against their neighbours. Minerva, the goddess of *Wisdom*, was represented with a helmet, shield and spear. "Ready, aye ready," was considered the height of practical sagacity. Let us not forget the teaching.

At this date twenty-five thousand Volunteers have been accepted. It is a large number in proportion to the population, but the volunteering has not reached its maximum: there will be no difficulty in doubling or quadrupling the number if emergencies should arise. Mere numbers, however, are of little avail if they be not well drilled and officered, and the science of war—at all events of that part of it which the French call *la petite guerre*—carefully studied. The breaking out of the war in the Crimea; the Indian Mutiny; and the sudden formation of Volunteer associations all over England, proved the signal for the publication of an infinite number of books, treating of "*la petite guerre*;" the only misfortune attending which, was that when they appeared, there was little time to digest their contents. Canada has not the same excuse. She is enjoying a profound calm, and cannot better employ it than in the pursuit of the theory of war.

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THE
VOLUNTEERS' HAND-BOOK.

Next in importance—if it really be secondary—to drill and field manoeuvres, is that description of knowledge which renders the Volunteer in the field independent of all the auxiliaries procurable with a regular army, or in home quarters. Before the American Civil War broke out, the Militia of the United States believed that it was invincible, because some attention had been paid to marching and counter-marching, and steadiness on parade; but as soon as these Volunteers found themselves *vis-à-vis* an enemy who had studied the science of warfare, knew how to throw up entrenchments, reconnoitre, and bivouac, they discovered their woful inferiority, and submitted to be frequently beaten. At Big Bethel, in 1861, they learned their first lesson—at Fredericksburg, in 1863, they received another—the intermediate period being occupied in similar melancholy experiences.

It is to prepare the Canada Volunteers against such disasters and disgrace that the following pages have been written. It is believed that they will be found no unimportant addendum to the Regulation Drill Book.

DISCIPLINE.

Whatever may be the notions of a young man for becoming a member of the Active Force,—whether they be founded in patriotism, military ardour, a passion for display, or a desire to quit home for active occupation elsewhere, he should carefully bear in mind that from the moment he becomes

a soldier, he parts, for a time, with the privileges of citizenship, and must be the obedient servant of the State, having no will of his own, no liberty of action, no unrestrained freedom of speech. This is a severe trial to begin with. But it *must* be endured. Rigid discipline and perfect steadiness are indispensable in the ranks, and these can only be assured through the prompt resignation on the part of Volunteers of all the license they may have enjoyed before they entered the force. In our free and happy country, youth are accustomed to so wide a latitude of action, and are so little habituated to veneration, that they find it a hard matter to curb their own restlessness, and place their every physical movement under the restraint imposed by military obligations. Uneasy on parade they are prone to resent, by unbecoming language or offensive gesture, the rebukes their superiors are occasionally necessitated to administer; and some few dishonourable soldiers have even been known to manifest, when off parade, a disposition to avenge the reproof addressed to their carelessness or disobedience in the execution of a duty. All this is as dangerous as it is reprehensible.

Let the Volunteer then learn that subordination, in the most exact signification of the term, is as requisite and becoming in a patriotic soldier as piety in a minister or skill in a surgeon: that it is his first and greatest obligation, as, without it, he is more dangerous and vexatious to his friends than to his enemies; degenerates into a brigand and an outlaw, and controverts the fundamental principles that gave him professional existence—the peace and safety of the commonwealth. By subordination, as by a universal intelligence, parts apparently the most averse and discordant are operated on and combined in the strictest unison, with ease and advantage. The submission of individuals through every rank, produces uniformity and energy in the whole, and enables the directing power to work for the public benefit. By, and under, its incalculably beneficial influence immense multitudes of undisciplined warriors have been overthrown and destroyed by comparatively insignificant bodies of better instructed men. These facts are patent to the scholar and even to the cursory reader; but they are either ‘caviare’ to our Volunteers, or have been forgotten by them. These latter are not alive to the lessons taught by the histories of old Greece and Rome. They know nothing of

Miltiades and Marathon, Leonidas and Thermopylæ, nor have they heard how Hannibal's chances of making Carthage superior to Rome were destroyed by his allowing his soldiers to indulge in luxury and effeminacy. Even the story of the indiscipline of the Israelites, which cost them a sojourn of forty years in the desert, under every earthly privation, is a sealed book to thousands. The philosophy of these valuable examples should not be lost, even though the details of the narrative may be forgotten or unknown.

The modern system of warfare exacts even a greater degree of subordination than was necessary in the armies of old times, because, in consequence of the weapons at present used, less scope is allowed to, and less benefit derived from, personal prowess or individual exertions than from the connected and complicated movements of large bodies impelled so as to effect the desired end. The Regulations of every civilized military power denounce the utmost vengeance against the violators of them, and surely none but the most infatuated can feel repugnance at obeying instructions calculated to ensure at once safety and conquest.

"Nothing so much embarrassed Washington, at the time he took the command of the Continental army, as the insubordination of the soldiers. In the ardour of their patriotism, they had rushed nobly out to defend the liberties of their country, but they were rendering their services nearly useless by their reckless disregard of obedience. Not accustomed to the duties of the camp, they could see no reason why they should be subjected to, what seemed to them, a senseless routine, and implicit submission to orders, without a why or wherefore. It was only by the sternness and resolution peculiar to the great commander, that they were ever brought into a state of discipline that rendered them efficient for duty. No military achievement ever was accomplished, or ever will be, unless there is a perfect and ready obedience on the part of the soldiery."

DRILL—THE RIFLE.

No time is lost after a soldier has joined the force in putting him through his drill. He is first taught to carry himself erect—head well up and square to the front; the chin near the stock; heels on the same line, the feet turned out

equally, forming, in that position, something less than a right angle; knees straight, without stiffness; the body erect on the hips, inclining a little forward; the shoulders square, and falling equally; the arms hanging naturally; the elbows near the body; the palm of the hand turned a little to the front, the little finger behind the seam of the pantaloons; the eyes fixed straight to the front, striking the ground about the distance of three paces.

This, with many young men, is a constrained attitude at first, but it soon becomes habitual and easy. Its value is considerable, for, unless all the soldiers in a rank stand equally upright, the alignment cannot be preserved. Moreover, attention to a good erect carriage, and to the drill which follows, has much influence in improving the health of a soldier by expanding his lungs, strengthening his limbs, and keeping him in frequent out-door action.

After a good military carriage is obtained, the soldier is taught to face to the right, and face to the left, and face about, turning on his right heel, and completely changing his front. He is next taught to raise his arms above his head, and place them behind his back (the palms meeting) without altering the erect position of his body. From this he proceeds to the balance step, raising one foot and keeping it in that position for some time, before it is advanced. All this is preparatory to learning to march, which he subsequently does at four different paces; marching in slow or common time, then quick time, next double quick (which is slow running), and finally running as fast as his legs, and the weight he may bear, will allow. The common time requires a pace of twenty-eight inches; ninety paces being marched in one minute; quick time requires that one hundred and ten steps of the same length shall be taken in the same time; and the double quick sometimes exacts one hundred and eighty steps in a minute.

When a soldier can march well, he is put to the use of the *musket* or *rifle*, or, in the instance of artillery, he is taught the various parts and uses of a *gun*—a term exclusively applied in the army to cannon—and then he is placed, with others, to *serve* a gun, which means to sponge out, ram home cartridge, place the cartridge in the mouth of the piece, *serve* the vent (in other words, stop the touch-hole with the left thumb while the sponging and ramming goes on) firing, pointing the cannon, and bringing the cartridges

from the ammunition box on the limber or carriage. The cavalry soldier is put to the riding school and subsequently to the broad sword and rifle exercise.

It is difficult to describe on paper and without the aid of diagrams and other illustrations, the various branches of the manual exercise. These are better acquired in the barrack yard or drill room. In like manner all the movements and evolutions of every arm of the service are more easily learnt on the parade ground or in the field. But much may be said of the musket and rifle apart from the drill.

Two descriptions of firelocks are still in use—the one with a small bore or tube and the other *rifled*. Rifling is effected by cutting the inside of a barrel in furrows running in a screw-like or spiral direction, which gives to the bullet in its exit a twist, and causes it to spin through the air on an axis coincident with its curve of flight, by which means very great precision of aim is acquired. The end of the bullet which first emerges from a rifle, strikes the object first,—in other words, so long as the spinning motion of the bullet continues the axis of rotation of the bullet does not change.

Taking advantage of this principle, rifle bullets are now generally made of a conical or pyriform shape, by which means an increased weight of metal can be fired from a bore of given diameter. A conical rifle ball will always strike tip foremost, and if the tip be made of steel the penetrating effect of the missile is terrific. The old smooth-bore muskets, called familiarly White-Bess or Brown-Bess according as the barrel was polished or bronzed, was a very useless machine for distant firing. It never could be depended upon at a greater range than one hundred yards. In fact, it has been demonstrated by a simple arithmetical process (dividing the number of bullets consumed by an army by the number of the enemy ascertained to have been hit), that it took several hundred bullets to kill or wound one man!

The reasons for the ineffectiveness of the smooth-bore were manifold. In the first place, the powder being very coarse, and too great a proportion of the cartridge being used by the soldiers in hastily firing, much less was ignited than required to propel the bullet; 2nd, the soldier from nervousness, or blinded by the smoke, or ignorant of the principles of firing, took an unsteady aim; 3rd, the *windage* of the

piece—that is to say the difference between the diameter of the bore and that of the bullet, which allowed of the explosion of powder elsewhere than below the ball—caused the latter to deviate or deflect as it left the muzzle.

Rifles are now constructed to send a bullet incredible distances, say one thousand two hundred or one thousand five hundred yards. But the utility of this flight, except when masses of artillery are known to be in certain directions rather than distinctly seen, is questionable. As stated elsewhere (see artillery section of this *brochure*), a man cannot be very accurately covered by a rifleman's aim beyond two hundred and fifty yards. It has been laid down, therefore, by Captain Thackeray of the British Militia, an able officer who has paid great attention to the subject, that the following rules will alone ensure success to the marksman.

At one hundred and twenty-five yards and any shorter distance near to it, aim at the centre of the soldier.

At one hundred and fifty yards, aim at his breast. At one hundred and seventy-five yards, aim at his head. At two hundred yards, aim at the top of his cap.

If a cavalry soldier is the object of the rifleman's attention, let him at one hundred and twenty-five yards, or a little less, aim at the horses' chest; at one hundred and fifty yards, at his head; at one hundred and seventy-five yards, at the breast of the rider; at two hundred yards, at the rider's head; at two hundred and fifty yards, at the top of his helmet.

The reason for thus accommodating the aim to the distance is, that the trajectory or curve of the ball in its flight, rises *above* the line of vision, within one hundred yards of the barrel, and falls below, within, or beyond it.

The rifle or musket should be held firmly to the shoulder of the marksman, that he may take the surer aim, and also escape the consequences of a recoil. Let time be taken in aiming. "It is better to fire one shot in ten minutes with good effect, than to fire ten ineffectual shots in a minute."

There are various methods of judging distances. Those which science has suggested or may suggest, should be shown to the soldier as part of the field or target drill. We will confine ourselves to the "rough and ready" mode recommended by Thackeray.

The soldier is supposed to have his rifle and sword bayonet fixed.

Let the soldier place his left foot square, and take one step with his right foot forward, to the extent, as nearly as may be, of twelve inches.

Let him place his rifle firmly on the ground, touching the point of his right toe, the rifle being placed so as to place the shank, or foot of the bayonet, parallel with his front.

Having ascertained by a sufficient number of experiments what would be the apparent height of an object placed at any given distance, as shown by his bayonet, let his bayonet, if need be, be slightly marked with a file, as a graduated scale for shewing distances of one hundred, two hundred yards, &c., this being done pretty accurately, he would be able to use his bayonet, as a stadium, which would, for all practical purposes, enable him to judge sufficiently nearly of distances, and would correct or aid his judgment formed from mere sight.

There is another essential point connected with distances, to which it is necessary to direct particular attention, which is, the firing at an object in motion.

A foot soldier gets over in a minute at a quick march about 72 yards, at the pace of a charge about 88 yards. A horse walks over about 433 yards in four and one-fourth minutes, trots over the same distance in about two minutes, and gallops over the same distance in about one minute.

A foot soldier occupies in rank a width of about two feet ; a trooper about three feet.

Now, suppose that a cavalry soldier be moving to or from the point of the line of vision, which is at point-blank range ; it is clear that if the rifle be fired to strike at point-blank range, the ball will either fall short of, or go beyond the cavalry soldier, by the distance that will be passed by him during the time taken in the flight of the ball. Allowance must therefore, in such circumstances, be made for this distance.

Suppose him to be coming nearer, in a direction perpendicular to the plane of projection, and to be at the point of point-blank range when aimed at, allowance must be made for his being somewhat nearer when the ball shall reach him, and an aim must be taken accordingly below the line of vision, or in other words, at the feet of the horse. By such means the ball would strike the head of the horse or the rider.

Suppose, on the other hand, the cavalry soldier be riding

away in the same plane of projection, allowance must be made for his being more distant when the ball reaches him, and an aim must then be taken above the line of vision, or, in other words, at the head of the cavalry soldier; the ball would strike the body of the horse or the rider in such case.

Allowance must also be made in case of his moving to the right or to the left; but as in this case his distance would be nearly the same, it will only be necessary to direct the rifle to the right or left, so as to compensate the probable distance in either of such directions that he may pass over.

In being engaged with an enemy, it will always be desirable, in estimating the distance, to fire the first round rather before than beyond him, since this will lead to a more just appreciation of the distance than could be obtained by firing beyond him; besides which, there would be the chance that the fire would not be thrown away, since the ricochet or bound of the balls may do him as serious an injury as a fire directed exactly into his ranks.

The just appreciation of distance is of the highest importance. Well skilled in this, the soldier seldom throws away a shot; and this has a double effect—the saving his ammunition, and the intimidation or destruction of the enemy. The value of his ammunition can never be too highly estimated, since nothing inspires more confidence in him than that he has a cartouch box well provided against every emergency. One single charge of ammunition may be the means, under a variety of circumstances, of saving his life, or of turning the tide of victory in his favor. The effect, too, of a well-directed fire on an enemy is not confined simply to his destruction; it distracts him, and throws him into disorder, and nothing makes so strong an impression on him as the having his ranks thinned by every discharge, whilst, on the other hand, it tends to animate and encourage the troops who are opposed to the enemy, and opens to them the chances of victory, not only by the cutting up of the enemy's ranks, but by introducing among them that fear of the skill and coolness of their opponents, which has a great moral influence in favor of the latter. Nothing, moreover, affords so favorable an opportunity for a successful charge as the effects produced by a steady and well directed fire. On the other hand, a hasty and ill-directed fire leads an enemy to hold his opponents in contempt, and

creates in him such confidence, as once felt, seldom quits him during the combat.

Finally—if a piece misses fire and a second cap does not produce a discharge, let the nipple be carefully cleaned out, taking care that the muzzle be elevated, lest any of the detonating powder which may remain, should, by the friction, accidentally explode and discharge the piece. If the piece will not go off after the third cap has been used, the cartridge must be withdrawn, and the barrel be well cleaned.

The duties of a soldier are generally performed in concert with others, and thus become simple and regular. But there is one important duty which devolves on every single soldier, isolated from his companions, and upon the correct performance of which, the safety of an entire regiment and sometimes of a whole army depends. This is the duty of the sentry. In that capacity it is demanded of a soldier that he shall be vigilant, steady, and rigid in the fulfilment of his orders, not allowing any one to approach within the length of his musket and fixed bayonet, nor to speak to him. An enemy, or spy in the service of an enemy, will seek every opportunity of getting into conversation with sentries, drawing away their attention, and perhaps ultimately disarming them and killing them on the spot. Even the officers and non-commissioned officers (sergeants and corporals) of the soldiers' own regiment should not be allowed to approach without giving the *parole* or *countersign*, which is a word arranged on the morning of every day by the officers commanding a garrison or regiment.*

GENERAL HABITS OF SOLDIERS.

Steadiness, under all circumstances is an indispensable quality in a soldier. To ensure this, he is earnestly advised to abstain from spirituous liquors of all kinds. After the first cup has been drank—and even that is often too much for some young heads—it is difficult to say where intoxication begins, and if the soldier is found in a state of ebriety, how-

* There are several anecdotes on record of Frederick of Prussia, Napoleon Bonaparte and the Duke of Wellington having been stopped by sentries and refused leave to pass because they could not give the countersign or pass-word.

ever slight, he is subjected to military penalties and his promotion is retarded. Drunkenness brings many crimes in its train. A soldier out of his senses will forget to salute his superior officer when he meets him—that is a crime,—he will make insolent replies to the questions of his officer and non-commissioned officer—he cannot stand steady on parade—all these are military crimes—he has been known, when drunk, to assault not only his brother soldiers but his superiors, and even to commit *murder* in a paroxysm of violence ! Let no man, therefore, “put an enemy into his mouth to steal away his brains.”

The importance of *Cleanliness* cannot be too forcibly impressed on the soldier's mind. It used to be said that the cleanest soldier was the dirtiest man, because the operation of cleaning his musket and bayonet, blackening his boots, pipe-claying his belts, polishing the brass ornaments of his cap, his breast plate, musket bands, &c., and brushing his clothes, covered his hands and face and often the rest of his body with dust and dirt. But there is no excuse for the continuance of the old saying. Water is always at hand—soap is in the knapsack, and ample time is allowed for ablu-tion. *Health* is wonderfully promoted by frequent washing of the body. Much water is not needed for the operation. A wet sponge passed over the body every morning, followed by a good, hard dry-rubbing will open the pores effectually, give free circulation to the blood, vigor to the muscle, and elasticity to the spirits. Soldiers who attend to this injunction will march better and longer than those who neglect it, their appetites will always be good, their sleep sound, and they will rarely be found within the walls of an hospital or infirmary. A Colonel of one of the British regiments in India, used to have the bugle sound for washing five minutes after the *reveille* and it was the duty of the subalterns to see that each man sponged himself. That regiment was more effective than any other in the army.

Ventilation of the barracks or tents is another source of health, and especially the ventilation at night. There is a foolish prejudice against night air. Why so ? As Water-ton justly writes, “it is nature's overflowing current, and never carries the destroying angel with it. See how soundly the delicate little wren and tender robin-red-breast sleep under its full and immediate influence, and how fresh and vigorous and joyous they rise amid the surrounding dew-

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drops of the morning. Although exposed all night long to the air of heaven their lungs are never out of order ; and this is acknowledged by the daily repetition of their song." One man, sleeping or waking, will by his inspiration and respiration *poison* ten cubic feet of air in one hour. Judge, then, what must be the result of a number of men sleeping together in the same room for seven or eight hours, inhaling one another's pestilential atmosphere. The soldier rises from his uneasy bed, under such circumstances, neither refreshed nor invigorated but languid, stupified and sick ; and he often ascribes to some accident or some over indulgence of the previous day what is but too generally the result of slumbering in a close tent or barrack room. Let any one enter such a room early of a morning after it has been slept in by two or three, or even by one individual—and his nasal organs will at once convince him that he is inhaling poisoned air.

Take as little physic as possible. If the head or the stomach are affected, instead of going to the hospital or troubling the surgeon of the corps, ask leave to remain in quarters off duty—abstain from eating or drinking anything unless it be cold water, and in less than twenty-four hours Nature will have administered relief. Half of our complaints spring from a disordered or exhausted stomach. Give it a day's repose—let it have nothing to do in the way of taking in food and digesting it, and the machinery will soon get into good working order again. The great Napoleon Bonaparte had great faith in what he called the equilibrium of Nature. If he had been partaking too freely of the "flesh pots," he would abstain from animal food for several days together: if he had been taking violent exercise in the field, he would follow this activity by some days of perfect repose. In this way he was always up to his work.

One word more in respect to health. Abstain as much as possible from tobacco. Whether smoked or chewed it is exceedingly pernicious in the long run. It injures the sight and enfeebles the nerves. No men can be good riflemen who use much tobacco. It is unnecessary to discuss its hygienic value ;—this fact is patent to all the civilized world, that inveterate smokers are no match at target shooting for those who abstain altogether from the drug, and it has also been established that when those who smoke or chew tobacco are so ill, from any cause, as to be obliged to go into hospital

it takes them a much longer time to recover than it would have done had they avoided using the article. Of course it does not act upon all men in the same manner, but this is the average result after a great many experiments have been made.

Finally, do not fold up your bed, whatever it may be, as soon as you have risen, but throw it open to the air that the perspiration absorbed by the sheets and blanket may have time to evaporate. What with insensible perspiration, inhalation and respiration, a healthy man loses *three pounds weight* in the course of a single night, and as a great deal of perspiration remains in the bed clothes opportunity should be given for its disappearance. This is what is understood by *airing* the bed.

THE SOLDIER IN THE FIELD.

The equipment of a soldier is entirely regulated by the government, and he has neither the means nor the opportunity of procuring many articles which are peculiarly suited to field service. The militia, in like manner, dresses and equips itself according to the will of the supreme authority in that department. But sometimes a discretion is allowed in the choice of articles of clothing and other necessities, while volunteer corps have often the opportunity of selecting what they shall wear in undress and carry to the field. A few hints, therefore, on these points may not be irrelevant.

Beginning with the head, it is advisable to select that kind of cap which will bear the roughest treatment without damage and which is equally suited to all weathers. The bear skin shakos worn by the British Guards and the French Imperial Guards and Pioneers, are very agreeable in winter time and make excellent pillows when placed on the knapsack. They are, however, very hot in warm climates and summer time even when covered with cotton cloth. The light kepi or fatigue cap, in general use, is agreeable to the head, but it affords no shade from the sun nor protection from snowstorms. Probably, the slouch felt hat is on all accounts, the most desirable. It is light, easily folded and stowed away, forms an apology for a pillow, a protection from the sun's rays, and may be converted, at a pinch, into a wash basin!

In addition to the jacket which may constitute the uniform of a corps, two or three red or blue woollen or flannel shirts are very desirable. They are good working and marching garments, because they absorb the exhalations from the body and do not readily show the dirt. Loose, baggy trousers of the same material for general and fatigue purposes, and for protection to the limbs at night, are also to be commended. A broad flannel bandage to be worn constantly round the loins and the abdomen, is a most important addition to a soldier's comfort. Besides being an excellent protection from cold of any kind, it sustains a man upon duty or the line of march whether on foot or on horseback.

Cotton socks are more to be recommended for use on the march than woollen socks. They keep the feet cooler, are less liable to chafe the wearer, and do not retain moisture so long. At the same time it is very desirable to have a pair of woollen or worsted socks in the knapsack to substitute for the cotton, if a man comes off a march or guard wet-footed.

A half boot, covering the ankle easily, or shoes with *leathern* gaiters attached to them, which slip on without occupying time in buttoning or otherwise making fast, constitute the best covering for the foot. The leather gaiters keep out rain and prevent the legs from being scratched by brambles, dry grass, and sharp pieces of rock. But by all means let the soles of the shoes be thick and well sown. In the common army shoes the water finds easy entrance to the foot. The shoes should have low heels, and be kept constantly greased. Sore feet are common. The best cure for them is said to be this; get a little common spirits—drop into it some tallow from a lighted candle; rub the feet well with this. If done at night put on a pair of socks. The feet will probably be all right in the morning. When good shoes are not to be had the best substitute that can be found for them is that of the ancient *pandours*, often adopted by the French soldiers during their long expedition in Algeria. It consists in binding round the foot linen rags wrapped up in a piece of skin freshly cut off and laced with small stripes of the same.

Much difference of opinion and difference of usage prevails respecting the best kind of great-coat for the soldier. Something may be said in favour of each kind of outer covering. From the experience of the author of this little book he is in favour of a cloak with arm sleeves and a hood. A cloak

of this kind worn by the French troops during the campaign in the Crimea and Italy and called a *capote*, was found to be far superior to the ordinary great-coat. The cloak or coat ought to be lined with India-rubber at the back, because it will protect the wearer when lying on the ground, from all risk of rheumatism, cold, sciatica, &c.

The knapsack is the soldier's wardrobe, his *escritoire*, his tool box, his plate chest, and his larder ! Its capacity, however, is limited and the weight of the articles put within it must be carefully considered. The articles of clothing are not numerous, but how many other things a soldier must carry to ensure him health, comfort and sustenance ! Places should be found for all the articles—or as many of them as can be stowed away—enumerated in the following list :—A clothes brush ; a small brush for polishing metal ; a comb ; a pair of scissors ; a housewife, containing needles and cotton thread ; a piece of cobbler's wax ; some twine ; some salt ; some nails ; a hammer ; a piece of sponge ; a piece of flannel ; two or three pieces of soap ; a small Bible and Prayer-Book, with linen covers ; a blank memorandum book and pencils ; three or four odd pieces of gray or blue cloth wherewith to patch clothes ; two or three cakes of chocolate, (a capital substitute for hard biscuit or dry meat, chewed *en route*) ; a lancet ; a few bandages ; a piece of diachylon plaster ; a little lint ; (a non-commissioned officer would do well to carry a little telescope, for he may be sent out on reconnoitring expeditions).

The knapsack itself should be made of the skin of the goat, calf or cow, the hairy side outwards ; and instead of the complication of straps which cut the arms, impede respiration, and require, in packing and suspension, the aid of a soldier's comrade, it ought to be supported on the shoulder by brass elastic bands. The shoulder and the upper part of the back are intended by Nature for the support of weights. Porters and milk maids think nothing of carrying two or three hundred pounds weight across the shoulders, and even bear heavy weights in the shape of knots and yokes as supports to other and greater weights.

THE MARCH—CROSSING RIVERS, ETC.

The whole secret of war consists in MARCHING, or as Marshal Saxe says, "in the legs." *Marches* prepare victories, *battles* decide them, *pursuit* completes them.

The soldier is now perfectly equipped. Each company, divided into platoons or sections, according to the breadth of the road to be traversed, sets forth, the muskets either shouldered or *eased* (that is, carried across the shoulder, sloping behind the back) or trailed. All forms of carrying the musket are adopted (at command) to relieve the soldier as much as possible. With his arms, his knapsack, his ammunition, two or three day's rations, and his great coat, a soldier carries from sixty to eighty pounds weight. If the knapsack be well slung and adjusted, this is not much, and use reconciles the feeblest man to the burthen.

In peace time, troops are seldom required to march more than fifteen miles a day, frequently twelve miles is the distance, but eighteen miles, where the climate is mild, and the roads tolerably good, may be accomplished without difficulty. A halt of seven minutes should take place at the end of each hour and a half. In time of war when *forced* marches are resorted to, either to reach a given point before the enemy, or to afford reinforcement to troops beset by a superior enemy, or to enable a general to execute some grand special movement, or to relieve a fortress, or get away from a larger and hostile force, as much as forty to fifty miles has been accomplished in a single day. The records of forced marches are numerous. The Roman infantry in Scipio's time frequently marched twenty miles in five hours: Cæsar is reported to have accomplished four hundred and fifty leagues in twenty-three days. This would have been at the rate of sixty miles a day! The Roman league must have been shorter than ours. The league in the countries of Europe is not uniform in its length. On this principle, it is less difficult to understand that Napoleon's army in 1797 marched in the mountainous parts of Italy, nearly fifty leagues in four days, which was about thirty-eight miles a day. In 1800 Marshal MacDonald retreated forty miles in one day, crossing rivers, "climbing mountains and glaciers." In 1808 the French troops pursued Sir John Moore's little army at the rate of twenty miles a day in the depth of winter, and in 1812 General Clausel fled from before the troops of Lord Wellington

at the rate of forty miles in twelve hours. In 1814, Bonaparte's army marched ten leagues a day besides fighting a battle every twenty four hours. But perhaps the grandest instance on record within the last few years was Havelock's march over the burning plains of India to rescue the soldiers and families surrounded at Cawnpore and Lucknow by thousands of infuriated Sepoys. The 64th foot, 78th Highlanders and artillery did not cover less than forty miles in each twenty-four hours with the thermometer at 110° in the sun!

But, however important it may be to be able to make forced marches in extremities, it is of much more consequence that a uniform cadence should be observed by the whole Volunteer Force in ordinary quick marching. If every regiment had its own peculiar pet pace—one pluming itself upon an amble and another upon a stride, it would be quite impossible for any General Officer to compute the time when corps on active service would arrive at a given point. To strike a prompt blow, or maintain an efficient defence in any given position or locality, the sudden concentration of troops from different quarters is often a matter of vital importance. If there were not a uniform pace throughout the service how could a commander direct the hours of departure from different quarters, so as to be tolerably certain (regard being had to the quality of the ground to be passed over) of their arriving just at the moment when they might be wanted. Napoleon's anxiety for the arrival of Grouchy on the plains of Waterloo, and the Duke of Wellington's cry, "would to God the night or Blucher were come," are striking instances of the value of the opportune arrival of reinforcements. Could the Emperor have insured the combined operations of all the divisions of the army of the Rhine against Ulm (in 1805) if there had not been a regulated pace for marching? Just see what a wonderful difference a slight variation in paces will make. Thirty-six paces are equal to 30 yards. There are 1,760 yards in a mile. Three miles, say, are generally accomplished in an hour. Now if one regiment marches but 30 paces, while another accomplishes 36 paces, it follows that the first is one yard behind the other at the end of every 30 yards, or 38 yards in every mile. Thus, at the end of a march of 15 miles, one regiment is nearly *half a mile* behind the other—a distance which might not be covered until the regiment first reaching the ground has been compelled to give way before superior numbers. In

the course of last year, Colonel MacMurdo, the inspector of the British Volunteers, dwelt emphatically upon the vast importance of a uniform cadence in marching.

It is a hard thing to be obliged to fight a battle, without resting, after a march, but it is a much harder one to be obliged to march with an enemy on both flanks and the rear fighting with you all the time. Such, however, may be the case, and the true soldier will compound with the harassments for the sake of the diversion. Xenophon's retreat with his 10,000 Greeks, was a continual series of combats;—so was the retreat of the poor French from Moscow, in 1812;—the Cossacks allowed them no repose. Massena's army was awfully cut up by the English divisions as it retired from Santarem into Spain, in 1811, and the British troops, in marching through the Cabul Mountains in 1841, on evacuating the country in deep snow, were literally cut to pieces by the Affghans. Against these misadventures, incidental to war, there is no possibility of guarding, nor can any other advice be offered to the soldier than to "bear a stout heart, trust in Providence, and keep his powder dry."

One of the greatest inconveniences attendant upon a march, whether during peace or war, is the fording of rivers, or of otherwise effecting their passage where bridges do not exist. When the depth does not exceed two and a half feet, infantry can ford, and four feet in the instance of cavalry or artillery. The river is forded generally near its elbow. Stakes are placed in the direction of the ford by the advanced or reconnoitring parties, to shew its width, and poles cautiously placed in advance of the waders determine its depth and safety. It is of importance that the bottom of the river be examined. Solid ground is preferable to any other. Mud, covered with stones, is impracticable for artillery and wagons. When a river is frozen hard it will allow of the passage of detachments; but the ice must be three inches thick for infantry, and six inches for cavalry and artillery. If the river be too deep to be forded, bridges must be constructed of boats, pontoons, or rafts. The india-rubber pontoons are the most portable and quite as efficacious as the iron or copper pontoons. They are a scientific elaboration of the system of crossing on inflated skins, adopted by the ancients, and still in use on the rivers of the Punjab. In the absence of pontoons, bridges of rafts of simple con-

struction are the best that can be used, and in America these are readily formed out of the abundance of wood generally found on or near the border of rivers.

Artillery, as we said, can cross a river about three and a-half feet deep, though much depends on the strength of the current. The ammunition boxes are so well made that the water will seldom penetrate through them, particularly if the river be narrow, and the guns pass quickly. The gun's canvass cartouches afford additional protection, and they may be taken out if necessary. When the water is deep, and the current strong, great attention must be paid to fording. If there has been no previous *reconnoissance* or preparation, guides are sought. The person conducting the column over a direct ford, should keep his eye steadily on an object on the opposite bank, which points out where the ford is; he must never look at the stream, which would deceive him, and would appear to carry him down, and he would endeavor to keep too high up the stream, and miss the ford. All those in the rear should keep their eyes on those in front; every individual should wade rather against the stream in order to resist its power. Troops should always cross a ford with the largest possible front, for the same reason. In fording, the horses should neither be allowed to trot, halt, or drink. Great attention and caution are required in passing over pontoon bridges, the vibratory motion of which is very dangerous, and should be lessened by every possible means. The troops in passing should not preserve an equal pace. There should be no halt on the bridge. As soon as the bridge is perceived to rock, the passage of the troops must be stopped. The greatest precaution is necessary to prevent accidents in tide at low water. The horses often have the greatest difficulty in keeping their feet, and the men must therefore always assist; holding on when going down, and manning the wheels of the guns when going up. The drivers must in some cases dismount, and an interval must be left between the carriages equal to their own length; they must be passed over gently. It may sometimes be necessary, unless the bridge be strong, to pass the carriages and horses over separately. In passing over a flying bridge, it may occasionally be advisable to take the horses out; and in boisterous weather, or at night, the wheels should be locked.

Should it be necessary to cross a broad rivulet formed by

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the recent melting of snow, and the water be rushing with great impetuosity, a direct line across the stream should not be attempted. A zig zag, or oblique course is then the safest, going at first in the direction of the stream, and as the legs become accustomed to the resistance of the water, gradually moving up and then giving way a little, with the feet, however, always planted as firmly as possible on the ground. The point of egress, or intended landing place, must always be steadily kept in view.

If the river be deep, and no means at hand for constructing bridges or rafts, swimming and other contrivances must be resorted to. If one good swimmer is in the party he may carry a rope, made of lariets in the absence of hemp, fastened to the shore, and fixing it fairly on the opposite side, it will protect those who may find it necessary to cling to it while working across the passage.

THE CAMP.

Let us suppose the march to have been conducted and to terminate agreeably, and the halt to be made on pleasant ground.

It is the business of the Quarter-Master General's department, to see to the encampment of the soldiers, but all hands, not on guard or other special duty, readily assist in erecting their temporary home. Suppose a regiment to be 600 strong. A camp for such a body of men would require to have a front of 600 ft. and a depth of 810 ft. It is arranged in order of battle, that is to say, the portion of the regiment which would be in the front at the commencement of an action occupying the front line. The tents of the Companies are arranged in streets, one half of them on each side, facing inwards. The distance between each tent is two feet, the distance between the tents of one company, and those of another is four feet. Down the centre of the camp runs a street forty feet in width, and in the centre of this is the marquee or tent of the commanding officer. The tents of the other officers face to the front—the captains on the right flank, the lieutenants on the left. The sergeants of companies occupy the first tent on the right of their companies. The company kitchens are placed—those of the right wing in a line with the right of their companies ;

those of the left wing on a line with the left of their companies ; they face towards the centre. The kitchens are constructed by digging a trench two feet deep, three feet broad, and ten feet long, in a line with the front of the mens' tents ; the earth which is excavated is thrown two feet back, so as to leave room for the construction of the flues and furnaces, on which the fire is to be placed for cooking. These furnaces are made by perforating holes horizontally in the bank, about six inches from the bottom of the trench, of a circular form, eight inches in diameter, and one foot deep, where they are communicated with by similar holes perforated from the top. The wood cut into small pieces, is placed in the lower holes, and the kettles placed over the top holes raised on three stones.

If the weather be rainy, or likely to be so, prudent soldiers will cut a little trench around their tents, eight inches from the bottom of the tents, that the water may run off, and they will also take measures to ensure to themselves a dry habitation and a bed. If there be much grass on the ground, it will be as well to cut it, and some of the grass around the tents. Expose it to the sun for two or three hours, and it may then be strewed over the ground within the tent, and offer at once a soft bed and protection from the nocturnal exhalations of the earth.

If an encampment continues on the same ground for some time, it will be very desirable that the tents be struck on some very fine sunny days at intervals of three or four days, that the earthen floor of each tent may be dried, and the tent itself purified by the exposure to the exterior air.

Camp tables and chairs are carried by a regiment in time of peace, and likewise in time of war, if there be no risk of any necessity for advancing far into an enemy's country and becoming surrounded. In the absence of these implements of civilization, large mess tables may be made out of the earth, even as furnaces are constructed. When General Lord Hill, one of Wellington's Lieutenants, was about to bid farewell to the division he had long and ably commanded, the officers gave him a dinner, and as they were without a table, a large circular trench was dug, three feet and a half in depth and four feet in breadth, leaving a level mass of earth in the centre forty feet in diameter. Within the trench the earth was not excavated entirely, but a bench two feet in breadth, and two and half feet in depth, was left

on the outer circle, and there the officers sat, having their impromptu table reaching to the chest. After this, smaller tables were frequently improvised when the army halted for some considerable time. Earth is a great friend to the soldier on the field, although she is trampled upon by him in an angry spirit, and often saturated with the blood of combatants. Among the other services to which earth is applicable, (not to speak of field fortifications, which will be hereafter treated,) may be mentioned, its depurating properties. Prudent and cleanly soldiers, having a regard to the health of a camp, will take care that the privies established in the rear frequently have earth thrown into them to prevent the diffusion of offensive and poisonous odours. The old warriors who figure in Scripture taught this valuable lesson, (see Numbers.)

Cavalry encampments do not differ much from those of the infantry. The horses are picketed in a line parallel to the tents, and twelve feet from the tent-poles, with their heads towards them. Artillery camps necessarily cover much ground. They are so arranged that the batteries may get quickly into action in the event of a sudden surprise.

There is little difference between the duties in a camp and those of a garrison. The drums beat the same signals; the bugle sounds for the same operations. There is the *réveillé* (often corrupted to rally) from the French verb, "to awaken," which is beaten at day-break: the *troop* which summons the men to mount guard for twenty-four hours; the *retreat* at sun-set; the *tattoo* to wind up the day. All absentees from camp or garrison after tattoo are liable to punishment. The *general* beats when the whole army is to march—the *assembly* is the signal for falling in—the *march* for the whole to move. The *long roll* is only beaten when the troops are suddenly called to arms. The *stable-call*, which is sounded three times a day, summons the cavalry to attend to their horses. The roll is called immediately after the *réveillé*, before the retreat, and after *tattoo*.

The number of guards in a camp depends upon the strength of a force, but the smallest always has its camp and quarter guard and its outpost guard.

Encampments usually take place on ground in the vicinity of water—the greatest necessity of military life. As soon, therefore, as the tents have been pitched, the men should

fill their several tins and other vessels for holding water, and while they are engaged in this occupation, they should not lose the opportunity of having a good wash. A march is a very dusty and dirty affair at the best of times and over the best roads.

THE BIVOUAC.

In many armies, and on many occasions with all armies, tents are not carried: the troops depend for shelter upon the towns or villages through which they may pass—sometimes a forest or grove offer protection—and very often no other habitation is available but such as the troops can make themselves. Huts, composed of the branches of trees and brush wood interlaced, are rapidly constructed. Straw, bound in sheaves, is often resorted to if abundance of corn is found standing in a hostile country. Some troops carry *tentes d'abri*—little square pieces of canvass with buttons on one side and button holes on the other, which, when united, and placed in a direction sloping inwards, will furnish a little protection to the back and head. Three or four muskets, or branches of trees, piled or stacked, forming angles with broad bases, and covered with the great coats or cloaks, are effective shelter from sun and rain. Napoleon Bonaparte was a great enemy to tents. "Tents," said he, "are not wholesome. It is better for the soldier to bivouac, because he can sleep with his feet towards a fire; he may shelter himself from the wind with a few boards and a little straw. The ground upon which he lies will be rapidly dried in the vicinity of the fire. Tents involve carriage. Those for each battalion load five pack horses, which are much better employed in carrying provisions. Tents are a subject of observation for the enemies' spies and officers of the staff: they give him an insight into your numbers, and the position that you occupy. An army ranged in two or three lines of bivouac, is only to be perceived at a distance by the smoke which the enemy may mistake for the vapour of the atmosphere. It is impossible to count the number of fires—it is easy to count the number of tents, and trace out the position that they occupy."

Take care that your own fires are kept as much out of view as possible. It is related by a traveller that some Red

Indians, with whom he came in contact, made a practice of digging holes in the earth, having carefully removed the turf in a circular clump; then, depositing leaves, &c., in the excavation, and lighting the fire, they partially covered it with the turf, and sitting by its side, with their cloaks completely enveloping the smoke, they concealed the presence of fire while they enjoyed the warmth it diffused.

Some care is requisite in picketting horses and mules *en bivouac*. If they are placed too near to each other, or are not sufficiently secured by head and heel ropes, they cause, by their neighing, quarrelling and restlessness (if they do not happen to be very much fatigued), a noise which seriously interferes with the repose of the entire camp. It is a good plan to encircle each animal with branches of trees, a little embankment of earth, or any other available protection. Accustomed to the stable, animals do not relish exposure during the night until they become accustomed to it. A little enclosure is a *make-believe* stable—the horses feel more independent, and the small wall thus raised around them protects their loins from the wind, and prevents their grass and forage from being blown about.

Too much care cannot be bestowed on the means adopted for procuring water. It is to be supposed that water in lakes, ponds or running streams, is in the immediate vicinity of the camp. Should the reservoir consist of a running stream, let the men be careful to draw their supply *above* the part of the stream where animals are taken to water. Animals render water turbulent, muddy, uncleanly. If the stream contains, as is too often the case, many leeches—it is a mercy to give the horses, mules, and cattle their draught from a leathern bucket after the leeches are taken out. Many a fine animal has been destroyed, or rendered very sick, by swallowing those troublesome but often serviceable little creatures.

If the water available for the camp is only to be found in a pond or ponds, care should be taken to filter it before drinking—unless the pond be unusually clear. Filtrating may be effected through a sponge, a little charcoal or sand. Put either of these filtering substances into your Garibaldi hat—make a small perforation in the crown—and pour the water into the hat, placing your tin cup beneath to receive the filtered liquid. It will do the hat no harm. Even if it has to be worn immediately, the damp will only serve to

keep the head cool until the powerful rays of the sun absorb the moisture. One of the best and most handy filterers (which may always be carried in the knapsack) is a composition of pumice-stone and sand, with a gutta percha tube attached, through which the water may be sucked. Thousands of portable filterers of this kind were manufactured and used during the Crimean war. In the absence of filterers, the water should be well boiled, and all the scum removed before being drunk, or it will generate disease.

In an enemy's country there is sometimes reason to fear that the water of the wells and ponds is poisoned. A commanding officer will therefore act wisely to cause it to be analysed by the surgeon of the regiment before any of it be used. This course was adopted in the campaigns of the English in India, and often with salutary effect.

It will sometimes happen that the halt is made where no water is immediately obtainable. If there is no rain, the only resource of the force is to be found in the night dew. A large blanket with a stick stretching out one end, and a rope attached to it, may be dragged over the grass early in the morning with good results. In some climates the dew falls very heavily. In others—and especially where the country is mountainous—water may be found either in springs or holes in the rocks. In the dry beds of streams its presence will be ascertained by driving a stick or ramrod into the earth; the water can be obtained by excavation. A flour barrel, perforated with small holes, makes a good well. After the sand has been removed, it should be forced down. Very often it will happen that no water reservoir of any kind is in sight, but the experienced eye of the traveller will look out for clumps of cotton-wool trees, willows, rushes, flags, and approaching them, springs or small pools will be found in their immediate neighbourhood, if indeed they are not at their very base. The tracks and trails of animals and the flight of birds towards one point, will infallibly indicate the direction in which water may be discovered.

When water has been procured, over and above the immediate wants of the troops, it will be very advisable to carry away as much as can possibly be conveyed, by way of protection against the contingencies of the next bivouac. It is astonishing how admirable a substitute water has been found to be for solid food. If a man takes a bath in the

morning, drinks a pint or so of water, and folds a handkerchief, saturated with water, round his throat, he will not experience the pangs of hunger for twenty-four hours. Horses are particularly susceptible of the nutritive properties of the element. Captain Marcy relates that, at the veterinary school at Alfort, near Paris, some experiments were tried at the instance of the Minister of War, when it was found that a horse could live on water alone for twenty-five days ; seventeen days without eating or drinking ; but only five days if *fed* and *unwatered*. All water-drinkers become fat men, because water deposits much adipose matter.

Fuel and fire are grand necessities which are not always at hand. Wax lucifer matches, packed in rectangular flat boxes—a lens, or a piece of tinder, flint and steel—are good aids at all times ; but if none of these are at hand, dry leaves or grass, the inner bark of dry trees, or the dried dung of cattle, (not horses or mules,) may be used as fuel, and fire obtained by discharging a piece of paper or rag into it. Ignition follows to a certainty. Take care in kindling fires to remove the grass in the immediate vicinity of the fuel, or the whole field may be ignited.

In countries of a marshy nature, where fever and ague prevail, the troops should sleep *between* two lines of fires. Air and warmth in ague districts furnish the best key to health. This is well understood in Abyssinia and in the Campagna of Rome.

SENTINELS IN [CAMP AND]BIVOUAC.

In a former page the important duty of sentries has been dwelt upon—a few more words may be acceptable, for the importance of the trust cannot be over estimated, especially in the field. As sentinels are placed on their posts by an officer or non-commissioned officer, they should not allow themselves to be relieved except by such functionaries—nor should they receive any order from any other than those persons, except the commanding officer or officer of the day who will intimate to the guard the order that has been given. Sentinels carry their arms at the support or shoulder, but *never quit* them. In rainy weather they carry the musket at the “*secure arms*.” Every man or party of men, ap-

proaching the post should be stopped, whether they be armed or not, until examined by an officer. A sentinel placed over the colors and arms must permit no person to touch them, except by order of some officer or non-commissioned officer of the guard. If placed over a magazine or supplies of any kind, it is his duty to call for the "*corporal of the guard*" if any person under the rank of an officer wishes to touch them. The same call should be made if he is attacked, or if any disorder takes place in his neighborhood, or if a fire occurs. In all cases he must discharge his musket in the first instance. It is the duty of sentinels to report all calls made from posts more distant from the main body of the guard than their own ; and no sentinel should be posted so distant as not to be heard by the guard, either directly or through other sentinels. Sentinels at the outposts communicate with their party by preconcerted signals, as whistling once or twice, &c. They pay no compliments as do sentinels elsewhere who present arms to general and field-officers and to the officer of the day and commanding officer ; to all other officers they carry arms. When a sentinel in his box sees an officer approach he stands at attention, and as the officer passes, he salutes him by bringing the left hand to the musket as high as the right shoulder. The sentinel at the guard tent, when he sees any body of troops, or an officer entitled to the compliment approach, must call out "*Turn out the Guard !*" After sunset guards never turn out as a matter of compliment.

THE COMMISSARIAT, COOKING IN THE FIELD, &c.

The rations allowed to the troops by the British Government are upon a very liberal scale. They are sufficient for all the wants of man, either in or out of camp,—*when they get them*. There is little or no difficulty on this head while in garrison, when the markets are abundant and the contractors active and conscientious. In the field, however, it is otherwise. Many circumstances conspire during war, and the long marches incidental to it, to produce a scarcity of the very requisite sustenance of the toiling soldier. The country may be poor ; the inhabitants disinclined to attend to the requisition of the commissariat officer ; the most needful articles, bread and meat, unattainable. It thus becomes

necessary for the troops in the field to look out for themselves, and foraging is at once elevated to a science. The French understand this better than any other nation in the world. But their notions of *meum* and *tuum* are not always those which honest men recognize. The great French Emperor and his Marshals held with generals of greater antiquity, that war should be made to support war, and that whatever was required by the soldiers, should be taken from the inhabitants without ceremony. The Duke of Wellington, on the other hand, would rather see his army starve than allow it to appropriate the goods of the people without paying for them. There was both honesty and policy in this, for it made the British respected, even in France, when that country was invaded in 1814, whereas the soldiers of the Emperor were regarded by the villagers and townspeople as a scourge. One way or other, however, food must be had, and when obtained, economised.*

When bread and biscuit cannot be supplied by the commissariat, the soldier can easily make bread for himself, if he can obtain a little flour of any kind from the villagers. A very palatable and sustaining bread is fabricated by mixing

* An order similar to those issued by the Duke of Wellington was recently promulgated by General Sandford of the New York State Militia, on his taking command of the forces entering Virginia. We cannot do better than repeat it in this place, for it embodies the feeling which should govern all similar movements into countries where the inhabitants do not join the hostile organized forces in attacking the Government troops.

HEAD QUARTERS, DEPARTMENT OF FAIRFAX VIRGINIA,
Arlington Heights, May 25, 1861.

Fairfax county being occupied by the troops under my command, I deem it proper to repeat the publicity of the assurance I have personally given to many of the good citizens about me, that all its inhabitants may return to, or remain in their houses, and pursue their usual pacific occupations, in peace and confidence, and with assured protection to their persons and property, as the United States forces in Virginia will be employed for no other purpose than that of the suppressing of unlawful combination against the constituted authorities of the Union, and of causing the laws thereof to be duly respected and executed.

By order of

Maj-Gen. CHARLES W. SANDFORD.

GEORGE W. MORRILL, Division Inspector.

flour with water, flattening the dough to the thickness of an eighth of an inch, and baking it on a flat piece of metal in a hole in the earth. A circular thin sheet of copper is the best. Each company might provide itself with one such baking plate. Throughout the East Indies, except on the lower plains, where rice is the staple food, the people, who are numbered by millions, live on wheat or oaten cakes made after the fashion here recommended. They are called *chapatties* and are very nutritious.

Good foragers will often bring in fowls, ducks, geese, &c., from the farms. The best way to cook them, as well as sheep and pigs, is to cut them up into small pieces and put them into a camp kettle, with pieces of pumpkin, cucumber, or any green food that can be obtained—(in the absence of vegetables, pieces of bread with salt will do)—and make a stew. Or, if no cooking pot be at hand, the meat may be baked. Make a fire in an earth hole, wrap the meat up in a cake of clay, first covering it with a piece of paper or cloth, and deposit it in the fuel. In less than an hour, pieces of three pounds weight will be well baked. A ruder mode of cooking is to skewer small pieces of raw meat on a ramrod, and holding the ramrod over a good fire in the earth, roast the meat. Should salt be scarce, a *very small* quantity of wet gunpowder rubbed on the meat will make it palatable.

The soldiers who straggled from the armies in Continental Europe, for the purpose of levying contributions on the inhabitants (in 1808 to 1814) suffered dearly for their temerity and injustice. Many of them were assassinated in the wine cellars and cottages; others were fallen upon by parties of guerillas and shot without trial. On the retreat of Wellington from Burgos, there were as many as twelve thousand stragglers in one day. Numbers were cut up by the French light troops. General Crawford, on his march to Talavera used to ride out after stragglers and take away their ramrods that he might afterwards recognize them on parade.

It has been said of the French troops that, with a pint of water and a stone, they will make a broth. The phrase is, of course, only intended to depict their skill in making much out of indifferent material. One thing is certain, however: The French soldiers who are from the provinces and accustomed to pastoral and agricultural pursuits, are familiar with

the various grasses which grow in the fields, and can distinguish between those which are eatable by human beings and those which are not. There are some hundreds of different kinds of grasses and Providence has decreed that many of them shall be suited to man, if he only has the art to distinguish them. The soldier should never lose an opportunity of procuring vegetables for they are of great use in helping digestion, purifying the blood, and preventing scurvy.

When more meat has been procured than is immediately required, the residue should be *jerked* for future use. *Jerking* means cutting the meat into strips, an inch thick, and hanging it in the sun to dry. In a few days it will dry so well that it may be kept for some time without risk of putrefaction.

A few words have been said regarding the advantage of drinking water before a march is begun. Much better, will it be, however, to drink coffee. There is nothing so nourishing, so wholesome, so inspiriting as coffee. A pint, or less, without milk, drank in the morning, and the remainder put into a soldier's tin for soaking his biscuit, will guarantee him against suffering from want of food for twenty-four hours. This, however, supposes the presence of all the necessary camp utensils for cooking, and brings us to the consideration of cooking in the field when all the rations are available and the means and appliances of the regimental caterer are at hand.

Captain Viele, in his excellent Hand Book for Active Service, justly remarks that the history of militia companies develops no fact more striking than that a very large percentage of the casualties are those of diseases incident to an improper diet. Especially was this made evident in the Mexican war, among the volunteer troops; called suddenly from the pursuits of civil life, and from the comforts and convenience of home, they were transferred at once to a climate different in every respect to that in which they had always lived. Exposed to every change of weather, from the intense heat of the plains to the freezing cold of the mountains; sleeping constantly in the open air; they universally exhibited that want of discretion in regard to their food, *the manner of cooking it*, and time of eating it, that would naturally be expected from men who had never been called upon to give the slightest thought to the subject?

Experientia docet ; let us profit by the lessons of the past. Monsieur Soyer has shown us how palatable and wholesome the soldier's mess may be rendered, and a few receipts for cooking are given in different works which may be beneficially transplanted to these pages.

RECEIPTS.

Soldier's soup for twenty-five men.—Fifteen quarts of water to twenty-five pounds of meat, two small tablespoonfuls of salt and half a one of pepper. About two pounds of rice put in while boiling, and what vegetables, fresh or preserved that can be procured—say three pounds.

Pork soup for twenty-five men.—In six gallons of cold water put twelve pounds of pork, three quarts of beans, two pounds of rice, season to suit ; let boil one hour and a half. Soak the beans over night.

Irish Stew for twenty-five men.—Twenty-five pounds of mutton, veal, beef, or pork cut into pieces six inches square, four pounds of onions, eight pounds of potatoes, four tablespoonfuls of salt, or 3 of pepper ; add eight quarts of water. Cook it from one to two hours slowly, thicken the gravy with flour mixed into a smooth paste with water, or potatoes mashed fine.

Tea for twenty-five men.—Allow twelve quarts of water ; put the rations of tea—a large teaspoonful to each—in a cloth tied up very loosely, throw it into a boiler while it is boiling hard for a moment. Then take off the boiler, cover it, and let it stand full ten minutes, when it will be ready to use ; first add milk and sugar, if to be had, at the rate of three pints or two quarts of milk, and a pound or a pound and a half of sugar.

Pork, with Peas or Beans for twenty-five men.—To fourteen pounds of pork add six pounds of peas or beans, put them in a cloth to boil, tying it very loosely, place them both in the boiler ; let them boil about two hours. Then take out the pork, add some flour to the gravy, and put the peas or beans in it with two or three onions cut up fine ; let it boil a little longer, mash up the vegetables very finely, and serve them round the dish with the meat.

Plain stewed meat for twenty-five men.—Take fourteen pounds of mutton, beef, veal, or pork, cut it into chunks and

put it in the boiler. Add four quarts of water, two quarts to a teaspoonful of salt and half a teaspoonful of pepper, eight or ten onions cut in pieces; let it boil half an hour, then let it stew slowly from half an hour to an hour longer, adding one pound of rice, potatoes or any vegetable that can be obtained; thicken the gravy with flour mixed to a smooth paste in cold water.

Stewed salt Pork or Beef for twenty-five men.—Wash the meat well, let it soak all night, wash out the salt as much as possible; eight pounds of salt beef, five pounds of salt pork, one-third of a pound of sugar, two pounds of sliced onions, six quarts of water, and a pound of rice; let it simmer gently for two or three hours.

Salt Pork with Potatoes and Cabbage for twenty-five men.—Take fifteen pounds of pork, extract the bones, three pounds of potatoes, two winter cabbages, let it boil for two hours; ten quarts of water. Serve the meat with vegetables round it. The gravy will make a good broth with peas, beans or rice added, also a little onion. Ship biscuit broken into the broth makes a very nutritious soup.

To fry any kind of meat.—Get your frying-pan very hot, put in some hot pork, which will immediately melt, then put in the meat you wish to fry, (a small teaspoonful of salt and a quarter of a teaspoonful of pepper to every pound of meat). When done lay the meat on a dish, add a pint of water to the fat in the frying-pan, a few slices of onions, or two teaspoonsful of vinegar, thicken it with a little flour and pour it over the cooked meat. Any sauce or a few chopped pickles may be substituted for the vinegar or onions.

Coffee for twenty-five men.—Take twelve quarts of water, when it boils add twenty ounces of coffee, mix it well and leave it on the fire till it commences to boil; then take it off and pour into it a little more than a quart of cold water; let it stand in a warm place full ten minutes; the dregs will settle at the bottom and the coffee be perfectly clear. Pour it then into another vessel, leaving the dregs in the first; add sugar, four teaspoonsful to the quart. If you can get milk leave out five quarts of water in the above receipt, and put milk in its place.

Peas or Bean soup for twenty-five men.—Take fourteen pounds of pork, eight quarts of peas or beans, twenty quarts of water, 25 teaspoonsful of sugar, twelve of pepper, and

several large onions ; boil gently till the vegetables are soft, from four to five hours.

Receipt for a small quantity of hashed meat.—Cut the meat in very small pieces ; heat the frying-pan ; put into it half a pint of water, half a teaspoonful of salt, and a teaspoonful of flour, and let it cook fifteen minutes. Salt meat can be cooked the same, omitting the salt, in its place putting a small spoonful of sugar, spices or pickles chopped fine, dish it on to some ship biscuit. Steak, chops, sausages, bacon, slices of any kind of meat can be cooked in a frying-pan, with a little melted fat at the bottom. Salt meat should always be soaked.

Stewed salt Beef and Pork.—Put into a canteen saucepan about two pounds of well soaked beef, cut in eight pieces ; half pound of salt pork, divided in two, and also soaked ; half a pound of rice (or six tablespoonfuls), half a pound of onions, or four middle sized ones, peeled and sliced ; two ounces of brown sugar, or one large tablespoonful ; one-quarter ounce of pepper, and five pints of water ; simmer gently for three hours, remove the fat from the top and serve. This dish is enough for rich people, and if the receipt be closely followed, you cannot fail to have an excellent food. London salt meat will require only a four hours soaking, being only slightly pickled.

Mutton Soup.—Put the rations of six into a pan (one-half pound of mutton will make a pint of good family soup), six pounds of mutton, cut in four or six pieces ; three-quarters of a pound of mixed vegetables or three ounces of preserved ; three and a half teaspoonfuls of salt ; one teaspoonful of sugar, and half a teaspoonful of pepper, if handy ; six ounces of barley or rice, or five tablespoonfuls of either ; eight pints of water ; let it simmer gently for three hours and a half, remove the fat, and serve. Bread and biscuit may be added in small quantities.

Plain Pea Soup.—Put in a pan two pounds of pork, well soaked, and cut into eight pieces ; pour six quarts of water ; one pound of split peas ; a teaspoonful of sugar ; half a teaspoonful of pepper ; four ounces of fresh vegetables, or two ounces of preserved, if handy ; let it boil gently for two hours, or until the peas are tender. When the pork is rather fat as is generally the case wash it only ; one-quarter of a pound of broken biscuit may be used for the soup. Salt beef, when rather fat and soaked, may be used for pea soup.

*French Beef Soup, or Pot au feu, (camp fashion).—*Put in the kettle six pounds of beef, cut into two or three pieces, bones included; one pound of mixed green vegetables, or half a pound of preserved, in cakes; four teaspoonfuls of salt, if handy; one teaspoonful of pepper, one of sugar, and three of cloves, and eight pints of water. Let it boil gently three hours; remove some of the fat and serve. The addition of a pound and a half of bread cut into slices, or one pound of broken biscuits, well soaked, will make a very nutritious soup. Skimming is not required.

The above three recipes are applicable to hospitals.

How to stew fresh Beef, Pork, Mutton and Veal.—Cut or chop two pounds of fresh beef into ten or twelve pieces, put these into a saucepan with one and a half teaspoonfuls of salt, one and a half teaspoonful of sugar, half a teaspoonful of pepper, two middle-sized onions sliced, half a pint of water. Set on the fire for ten minutes until forming a thick gravy. Add a good tablespoonful of flour, stir on the fire a few minutes, add a quart and a half of water, let the whole simmer until the meat is tender. Beef will take from two and a half to three hours, mutton and pork about two hours, veal one hour and a quarter to one hour and a half; onions, sugar and pepper, if not to be had, must be omitted; it will even then make a good dish; half a pound of sliced potatoes or two ounces of preserved potatoes; ration vegetables may be added, also a small dumpling.

Plain boiled salt Beef.—For six rations put in a canteen sauce-pan, six pounds of well soaked beef, cut in two, with three quarts of cold water, simmer gently three hours, and serve. About a pound of either carrots, turnips, parsnips, greens or cabbages or dumplings may be boiled with it.

Plum-pudding.—Put into a basin one pound of flour, three-quarters of a pound of raisins (stoned, if time be allowed), three-quarters of a pound of the fat of salt pork (well washed, cut into small pieces or chopped), two tablespoonfuls of sugar or treacle; add half a pint of water, mix all together; put into cloth tied tightly; boil for four hours, and serve. If time will not admit, boil only two hours, though four are preferable. How to spoil the above:—add anything to it.

THE HORSE.

Although the cavalry and horse artillery soldiers have more interest in the care of horses than the infantry and engineers, the latter are not altogether independent of these useful animals ; on the contrary, they continually avail themselves of their services for the transport of baggage and provisions. To all, therefore, a few hints may be addressed respecting the care of horses, their power, their speed and their general value.

A pack horse can carry from two hundred and fifty to three hundred pounds, twenty miles a day. This is the maximum. A heavy dragoon horse in European armies actually carries, man and appointments, two hundred and sixty-three pounds ; the day's rations—horse, twenty pounds ; man, six pounds ; total, two hundred and ninety-two pounds. a rider is much less distressing to a horse than an equal dead weight. A draught horse can draw 1,600lbs a day, carriage included. A load on the back is the worst application of the strength of a horse. A horse equals five to seven men at a pull. He moves four hundred yards, at a walk of 3·5 miles an hour, in 3·9 minutes ; at a trot of seven miles an hour, in two minutes ; at a gallop of eleven miles an hour, in 1·4 minute.

The rations of a horse should not be less than ten pounds of oats, twelve pounds of hay, eight pounds of straw in stables ; away from them, eight pounds of oats, eighteen of hay, and six of straw ; and when neither oats nor bran can be obtained, thirty-two pounds of hay. A horse requires about four gallons of water.

Six horses can drag a nine-pounder gun four miles in an hour and a half ; eight miles in four hours, and sixteen miles in ten hours, allowing for halts. With light loads a horse walks from three and a half to four miles an hour.

We have offered in a previous page a few remarks on the value of water to horses, and the importance of enclosing them in little embankments of earth or bushes. A word or two on sore backs will not be out of place.

The great security against sore backs is good saddling, full and well stuffed, and not using the surcingle to keep on the blanket without a full and well stuffed pad under it. Blankets under the saddles only cause festatory withers, from the improbability of their being properly adjusted.

Horses backs should be examined not only in taking off the saddles, but more particularly on saddling,—the least finching on the part of the animal should be taken notice of, and be sufficient cause to stop him from work, or having anything to put on his back ; hot fomentations and poultices should be applied constantly, if there is much tumefaction and pain, so as to arrest and check the deep seated inflammation, suppuration, and the formation of sores, &c., that may lead to the destruction of the animal. A great deal of the utility, health and comfort of a horse depends on the saddle. Pads or soft saddles without trees are very objectionable—they are positively cruel. The saddle should not be small, but spacious and well stuffed, especially towards the shoulders. It should be remembered also, that when a saddle has been used a little while the stuffing gets sweated through, and becomes hard and knotty from unequal pressure. To avoid this the stuffing should be taken out frequently, and though the same material may be put in again it should be thoroughly pulled and dried. Saddles should be kept in a dry place, and never used again until the lining has been thoroughly dried. Nothing is more apt to gall a horses' back than a damp saddle. When a horse is vicious to mount, nine times in ten he is or has been badly saddled. Many horses have a trick of swelling themselves out when first saddled ; it is therefore a good plan to saddle them about half an hour before they are wanted, and then girt up a hole or two just before mounting. The girths should not be too forward in saddling. If any one wishes to understand the reason why, let him buckle a strap tight round his own chest, and then try to run with it. He can bear it round the *waist* well enough, but the chest expands with exercise, and to confine it must be very severe punishment.

Cavalry soldiers being guided by the instructions which form part of their professional training, it may be unnecessary to tell them how to treat horses after a march, or to give them any hints for the equine diseases. We must be understood as addressing ourselves to volunteers, mounted infantry officers, and those who have not been accustomed to horses.

"The merciful man is merciful to his beast." Acting upon this maxim—no less humane than politic—the owner, rider, or driver of a horse will see to the animal's comfort

before he attends to his own. As soon as the camping ground is reached the soldier will take his horse to the nearest water, and after brushing at the hoofs, wash the legs well and dry them thoroughly. Bandages round the limbs will be a relief and promote the drying, but if left over three hours around the limbs they are liable to impede circulation. The back should be rubbed dry after removing the saddle, and the face, eyes, nostrils, and dock well washed. Select a grassy spot for the picket of the horse, and confine him by the hind legs only, that he may eat around him within the radius of the rope by which he is tethered. If the state of his inside renders green food unadvisable he should be made fast by the head. Then give him his first feed ; but take care not to feed him where he has been rubbed or curry-combed, for the dust raised from his coat is liable to mix with his food. Take particular notice of his manner. No cough, distress, or illness of any kind, or refusal to feed, (or irregularity in stabling or dunging) should be allowed to pass unnoticed. The vigilant eye of the owner is his only security. If the horse refuses his oats mix it with chaff and beans, &c., sprinkling with salt. Take care not to feed him until he has been washed and rubbed down, for if a horse is fed immediately he comes from his work, he is nearly sure to blow upon his corn and leave it.

All who have to travel on horseback, or are likely to have charge of horses in any way, absent from home and resources, ought to make themselves in some measure acquainted with the veterinary art to the extent at least, of being able to shoe a horse, bleed him, and give him a dose, and have at hand a lancet or fleam, nails, hammer, and a few shoes. Remember for want of a nail the shoe was lost, for want of a shoe the horse was lost, and for want of a horse *the man* was lost.* Only a few suggestions can be offered to the man

*In a little volume written by a General Officer of the French army, and published in 1815, occurs the following passage:—

"Cavalry, bestow all your attention upon adjusting your saddle and bridle ; always keep for your horse four spare shoes, with as many nails as are necessary to fix them, *and half as many again.*"

He adds, "the two great problems of War are to find harness that will not hurt the horse, and shoes that will not hurt the feet of the infantry soldier."

who is ignorant of so delicate a science as that of horsedoc-
toring, for he must confine himself to the simplest remedies.
In shoeing let him be careful to use the least number of
nails that will keep the shoe on for the time, incline them
well outwards, bearing in mind that the horny crust of the
foot is not more than half an inch thick at the edge. If it
be necessary to bleed the horse, rub the neck on the near
side close to the throat until the vein rises ; to keep it full
tie a string round the neck just below the middle, strike the
fleam into the vein smartly with a short stick ; if the blood
does not flow freely, the blow being properly struck, it may
be made to do so by holding the head well up and causing
the horse to move it about. A sharp pen knife may be used
in case of necessity but is dangerous. In case of urgency,
a dose may be poured down a horse's throat from a bottle.
The mouth to be forced open, tongue held in one side, head
raised, and neck of bottle put well into the mouth. For
kicks, sprains, contusions, and wounds, hot fomentations,
poultices and cold water, accompanied by a dose of aloes
and bran, form the best remedies. The complaints most
common to horses are glanders and mange—the former oc-
curring when stables are not well ventilated, the latter in
the field, especially in winter time. If the coat of the horse
be kept very clean, after he has put on his winter coat,
there is less risk of his being attacked by mange ; but if it
does occur he should have a dose of physic, and be clipped
from the root of the ear each side of the mane, getting
wider over the withers and back to the hips, and then round
to the tail, and a couple of inches down that if necessary.
Oil and wash the skin afterwards. This process will allay
the irritation and prevent the perpetual scratching which
ruins the skin of horses, and spoils their temper, and pre-
vents them eating their meals in comfort.

ENTRENCHMENTS, FIELD WORKS, &C.

It happens continually that, upon the advance of a force
into an enemy's territory, it becomes necessary to entrench
the camp, either for the purpose of making good the posi-
tion gained, until further operations can be undertaken, or
to await the arrival of a relief and reinforcement if the

enemy threaten the camp. Or it may be that entrenchments are needful to resist an enemy suddenly if he approach with a superior force.

Entrenchments are never intended to be permanent, but should evidently be of sufficient strength to oppose the artillery of a foe.

Entrenchments are variously constructed. They are generally established in places which are well flanked, but not dominated. They are all the stronger if a river or a forest terminate either end of the line, and all the weaker if there be rising ground in their vicinity, where an enemy can plant his guns.

The *material* of an entrenchment depends much upon the character of the ground, and the quality of the country. The first idea is to construct the field works of earth, as the most simple, the most reliable, and the most easily obtainable substance. A ditch is dug all along the front of the line of encampment, and of the earth thus obtained and called the *remblai*, a wall or parapet is raised. The breadth of the ditch is seldom less than ten feet, and its depth about eight feet. As the superficies of soil removed from its natural position increases by one sixth, a work may be constructed much higher and deeper than the extent of the excavation would, at first, lead us to suppose.

In removing the earth, as many men are employed as the necessity for rapidly entrenching the corps will justify. These men are divided into squads, some being supplied with spades, some with pick axes, and the others rammers. Wheelbarrows are requisite to carry the earth up as the excavation proceeds, and planks to furnish an easy pathway from the bottom to the surface. It is now that horny hands and sinewy arms become serviceable to the soldier. There is in most regiments a detachment of pioneers, who bravely march in front carrying adzes, saws, spades, and buff leather aprons, but it stands to reason that they are quite insufficient, numerically, to perform the work of a corps, however useful they may be in shewing how the thing is to be done.

The ditch being dug, the distance is measured off from the upper edge or crest of the opposite slope or counterscarp, to the intended depth of the parapet, and stakes are erected in the form which the profile of the work is to bear, to guide the soldiers in piling up and flattening the earth.—

See Illustration, "*Details of Construction.*" The parapet is generally made about eight feet high, with a bank behind it four feet from the ground, on which the soldiers stand to fire at the enemy. The upper part of the parapet is sloped downwards so that the soldier may command an adversary who shall approach the edge of the counterscarp. The front and rear of the parapet are likewise sloped that the earth may not fall down from its own weight, and above the escarp are left two feet of level earth, called a *berm*, to receive the earth of the parapet if it should crumble down under the enemy's fire.

The best earth wherewith to construct a parapet, is clay with a grassy surface. Clay resists cannon shot better than any other, being more compact and elastic, and the turf carefully removed from its surface makes the most suitable covering for the work. A parapet, eight feet in thickness, will resist a round shot fired from a six-pounder at a distance of five hundred yards. The shot will only be embedded in six feet of the earth. A parapet, fourteen feet deep, is proof against the fire of an eighteen-pounder gun at the same distance.

Where the soil is loose and scanty, artificial methods must be resorted to in the erection of the parapet. The chief of these are *gabions*, *fascines*, and *sand-bags*. The *gabion* is a cylindrical basket, about two feet high and a foot and a half in diameter, and open at each end. It is constructed by driving three or four stakes into the ground and twisting osier firmly around them. These being filled with earth of a gravelly or sandy nature, constitute a very strong wall when placed four deep and of the usual altitude of a parapet. When osier or willows do not grow in the vicinity of the place where it may become necessary to raise a breast-work, recourse is to be had to *fascines*—so called because of their resemblance to the *fascies* carried by the Roman lictors. They consist of twigs and small branches of trees from six to eighteen feet in length, bound together with pliant twigs, or tendrils, or osier, in bundles of about six or eight inches in diameter. Piled up to the requisite height and thickness of the parapet, these fascines form excellent cover, and can be transported from place to place. They are, however, liable to catch fire if shell, hand grenades, or red hot shot are thrown into them. The *sand-bag* almost speaks for itself. Bags filled with sand, or loose earth, make good substitutes

for parapets of solid earth. They resist shot admirably—in which respect they resemble the cotton bale, which has ere now furnished a good defence against the assaults of an enemy.

The parapet completed—and a good one may be run up in a few hours, if there be men enough for the work and materials and tools at hand—the next consideration is the construction of *obstacles* of various kinds so as to render the approach to the breast-work hazardous to an enemy. These obstacles are of various kinds. *Abattis*, *trous de loup*, *palisades*, *stockades*, *chevaux de frize*, *calthrops*, and *fougasses*.

The *abattis* consist of young trees about eighteen feet in length, with their leaves stripped off, the outer ends of the branches pointed, and the bottom of the trunk charred or dipped in pitch to prevent premature decay after they have been placed in the ground. The young tree is selected because the sap which it contains renders it less liable to ignition, and better capable of resisting the axe of the pioneer. These trees, placed nearly horizontally along the outer edge or *counterscarp* of the ditch, serve to conceal the ditch and expose the attacking party to a continuous fire from the parapet while they are endeavouring to remove or destroy the *abattis*.

The *trous de loup*, or wolf holes—so called because they resemble the traps formerly employed by the French peasantry to catch the wolves which infested the country—consist of pits (in front of the *abattis*) seven feet deep, dug in the shape of an inverted cone, having a sharpened stake stuck in the centre. Attacks being generally made in the night time, many of the advancing force fall into these traps suffering injury if not death by impalement on the stake.

Palisades are stakes fixed in the escarp of the ditch, sloping upwards at an angle of forty-five degrees—or in the *counterscarp*. In the latter case they acquire the name of *fraises*.

Chevaux de frize are long poles stuck full of iron spikes or sword blades, and supported at either end by spokes placed cross-wise. If the pole is made to revolve, the *cheval de frize* is a very formidable obstacle at close quarters. At the storming of Badajos, in Spain, (1812) hundreds of Englishmen fell before the French *fusillade* delivered behind the artificial barricade at the breach.

Calthrops, or crow's feet, are not much used now a days.

They were made by tying the heads of three or four nails together, with the points directed different ways, so that when thrown upon the ground one point at least should always be uppermost. They were very effective against the progress of hostile cavalry, but are not particularly serviceable in arresting the advance of infantry.

Stockades are palings, erected in the ditch to bring a flanking fire to bear upon the enemy after he has penetrated to the ditch.

Fougasses are small mines or boxes half filled with gunpowder, and deposited beneath the counterscarp. From the *fougasse* to the inner part of the work, a long hose, called a *saucisson* (little sausage) extends, and this being filled with a train of gunpowder, enables the garrison or defensive party to ignite the mine when the assailants reach the counterscarp, and thus complete the work left unfinished by the other obstacle.

Such a powerful array of obstacles, though they may not ultimately prevent a powerful enemy from forcing an entrance into the encampment, must break his order of attack, cramp and impede his movement, and detain him under a close and severe fire, if he persists in forcing his way through. He can seldom reform under such circumstances, and if he attacks in disorder the chances are against his success.

Entrenched positions are seldom isolated—they are generally established in the vicinity of towns or villages. The materials are consequently at hand for their construction. Houses are unroofed, floors are torn up, the trees of plantations and orchards are felled.

The order of defence is thus succinctly given in a recently published work.

“As soon as the enemy's light troops advance, the parapets are to be manned; sandbags previously filled are placed along the parapet, leaving loop-holes between them; they are musket-shot proof and give the men the necessary confidence to enable them to take a steady aim. One rank of men is sufficient on the banquette, others being placed behind them to load. A reserve is to be stationed under cover, who fall upon the assailants with the bayonet, should they succeed in getting into the work. For a good defence there ought to be a file (two men—one in front and one in the rear) to man the parapet with a reserve of one fourth, or one sixth, of the whole, in addition. * * * * *

A sortie (very rarely) may be made, should the enemy be thrown into disorder ; but this step requires great caution, for should the sortie be repelled, the enemy may enter the work with the retiring troops."

Soldiers on a sortie should be very careful not to allow their enthusiasm to carry them beyond bounds or they may get separated from their comrades and be made prisoners by a rallying enemy. An anecdote of Irish enthusiasm on an occasion of this kind occurs to us. When the forty-seventh and eighty-seventh regiments of British infantry defended the ramparts of Tarifa, near Gibraltar, on the attack by the French in the year 1811, as soon as the French troops began to retire before the fire of the garrison, some of the eighty-seventh Royal Irish Fusiliers, scrambled over the breach and pursued them. Major (afterwards Lord) Gough, perceiving the danger to which the men were exposed, recalled them, but one man continuing to run—the Major went after him and brought him back. "Where the devil were you going to, Paddy?" said the Major. "Oh, by jabbers," said the soldier "I was going to tache them what it is to attack the Aiglers!" The "Aiglers" or "Eaglers" was the name adopted by the eighty-seventh, because, at the battle of Barossa, they captured an Eagle from the French army.

"To prevent the surprise of an entrenchment, outposts," says the author last quoted from, "are stationed round the work at night, and heaps of dried brushwood, or tarred fascines, should be placed along the posts at intervals; at the approach of the enemy the outposts retire into the work, having set fire to the piles of brushwood; this will, in a great measure, prevent an enemy from concealing himself near the work."

The horizontal form given to field works, must very much depend upon the form and the character of the position taken up or to be defended. If an avenue or a bridge is to be protected, a *Redan*, having the shape of an arrow head, but constructed entirely after the principle of the parapet, and having a ditch, &c., &c., is the kind of work best suited to the occasion. A *double Redan* forms a good enclosure to a farm-yard and adjoining meadow, and is also a good out work. It is sometimes called a *horn work* from the resemblance which it bears to two horns or right angles united. The inner faces of the work constitute reciprocal

defences. *Cremaillere** lines are very useful down the sides of hills or on a sea shore, or in any situation where there is not much room for projecting the salients, and a long front has to be protected. *Redoubts*, small forts of various plans, square, circular or star shaped, advantageously placed upon a rising ground, commanding and protecting other works—*Tete de pont*, or bridge head, may take the form of either of the above except the Redoubt, with the addition or substitute of a *Lunette*.

It is astonishing how quickly field works may be raised. In the course of a single night or day of eight hours, a simple parapet can be thrown up if there be a sufficiency of men, but the more time there is at command, of course the stronger the work may be made. If a very extensive space of ground has to be defended, it will often be considered necessary to raise a series of works either connected by long straight walls, or placed at such a distance from each other, that the fire from either will protect its neighbor. Some very strong lines of this kind have been constructed at different times. The Lines of Torres Vedras, which Wellington caused to be constructed for the protection of Lisbon, in eighteen hundred and ten, were found to be impregnable by a French army in eighteen hundred and eleven. The lines of Toulouse, constructed by Marshal Soult, were in the same style. A more notable instance of the strength of detailed works was, however, supplied by the Russians at Sebastopol, in eighteen hundred and fifty-five. Those works were of amazing thickness and strength, and as the garrison had an unlimited supply of material, no sooner was one work knocked to pieces or damaged, than a substitute was erected. The works were in some instances twenty to thirty feet in thickness, affording shelter, beneath the banquette, for the troops on duty in the trenches.

Vauban, the most distinguished of French engineers, in the service of Louis XIV., adopted a series of continued lines, or *serrated* lines—so called from the resemblance which the horizontal drawing or projection of their works

* Almost all the terms in fortification are derived from the French, whose engineers had a fancy for naming the works after the object they represented. Thus, *Cremailliere* or flesh hook,—because the horizontal projection of the entrenchment resembled that instrument;—*tenaille*, or pincers; *lunette*, spectacle; *fleiche*, arrow head, and so on.

bore to a saw (*serratus*). The great objection to these lines, when enclosing a large surface of country, was that they required too large a body of men for their defence. They are now nearly disused. The last occasion of their employment was at the siege of Sebastopol, when they formed a line of contravallation to defend the rear of the allied camp.

The most notable illustration of the value of entrenching, occupies a page in American History. From behind the breastworks of New Orleans, General Jackson, with six thousand militia, defied and repelled twelve thousand British troops. The British lost one thousand seven hundred killed and wounded ; the Americans had seven killed and eight wounded.

ARTILLERY.

The word "artillery" in a general sense, applies to all projectile machines of war. In usual parlance it refers only to cannon, and in that sense signifies, 1st. Guns and their equipment ; 2nd. The troops serving them ; 3rd. The science of their construction and use. Artillery is the powerful arm of modern warfare. By its means fortresses are defended or reduced, and large bodies of troops speedily decimated. On board ship it is similarly used for destructive purposes. Sea fights are almost entirely decided by the cannon, and towns have been frequently bombarded from sea by the artillery on board of men-of-war. Cannon first came into use in France, at the battle of Cressy, when the Black Prince defeated the French. The guns then employed were of very rude construction and poor material. For many years but little improvement was made in them, but for the last century and a half they have become the most terrible engines of destruction ; and of late years the inventions and calculations of men of science have vastly increased their strength, their calibre and mischievous powers. It is the artillery of an army which now decides battles. No advantage in infantry or cavalry can compensate for an inferiority in the ordnance department of a force.

In speaking of cannon, artillerists only use the word *gun*, all the smaller kinds of fire arms having their respective names, such as musket, rifle, pistol, &c., to distinguish them.

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The principle of construction of a gun is the same throughout the various pieces of ordnance. Their length has five divisions or parts, viz., the *caseable*, the *first reinforce*, the *second reinforce*, the *chase*, and the *muzzle*. Each of these parts is externally separated from the other by a ring; internally the bore or tube is uninterrupted. This bore was formerly quite smooth, but since it has been discovered that accuracy of aim can be better assured by spiral or straight grooves within the bore, many cannon are rifled. Among the men of science who have contributed the most to the improvement of artillery, we may mention the names of Paixhan,* Lancaster, Dahlgren, Armstrong, Whitworth, and Napoleon III., though many others have in a small way suggested changes, and the use of various kinds of destructive shot.

The various pieces of artillery in use are severally denominated mortars, siege guns, 68 pounder, 32 pounder, 24 pounder, 18 pounder, howitzers, 12 pounder, 9 pounder, 6 pounder, and carronades. The word pounder expresses the weight of the shot discharged from the several pieces. The mortar is a short and very thick piece of artillery, generally of iron, having a large bore for the reception of shells, or hollow shot. The mortar is used for throwing shells to a considerable distance. It is always placed at the same elevation, and the flight of the destructive spheres which it is employed to propel, is regulated by the charge of powder placed within it. Siege guns, among the largest and most powerful description of which are the Columbiad, of exclusive American manufacture, are used to propel either round solid shot, shells, grape-shot, or canister shot, as occasion may require. All the rest, from the 24 pounder downwards, are used as field guns, and are dragged on the march, and during an action from one point to another, by men or horses, (in India by bullocks and horses) according to cir-

* Capt. (now General) Halleck, in his elaborate and interesting work on the elements of military arts and science, says that the Paixhan gun and the Columbiad are one and the same thing. The Columbiads were invented as far back as 1812, by Captain Bowfad, of the U. S. Army, and were used in the war with Great Britain. The dimensions of the gun having been taken to France by a young French officer, were given by him to General Paixhan, who at once introduced them into the French Army, and they have since borne his name.

circumstances. In some mountainous countries the ordnance is carried by mules or elephants, and during Napoleon's campaign in Italy in 1800, the guns were deposited in the trunks of trees severed longitudinally, and drawn through the snow by sheer manual labor. In the northern parts of India, small carronades are mounted on the humps of camels and fired from those elevations. The Sikhs used them in their wars before the country fell into the possession of the English, and gave them the name of *Zamboreks*, or wasps.

The material used in the manufacture of guns is brass or iron. Iron guns are less expensive than brass and better able to sustain long-continued and rapid firing. At some of the great sieges of the present century, such guns have been known to fire 1250 times in 100 hours without being rendered unserviceable. Three times the same number of brass guns would have been required to produce the same effect, or maintain such long and rapid firing. The reason why brass field pieces are used, and especially howitzers, is, that they are much lighter than iron guns, and can be cast of the same calibre without bursting.

As the resistance of the air and the force of gravity causes a shot to descend the moment it quits the mouth of a gun, a certain degree of elevation is necessarily given to every piece to insure accuracy of flight. The *point blank* range of *iron* guns, thirty-two, twenty-four, eighteen and twelve pounders, with solid shot, varies from three hundred and eighty to two hundred and sixty yards; from which to one thousand two hundred yards every quarter degree (measured from a tangent scale fitted either in the block or trail of a gun, or in a groove bored in its breech) increases the range about one hundred yards, and from one thousand two hundred yards, to one thousand five hundred yards, every quarter degree increases the range about fifty yards. The *point blank* range of *brass* guns, twelve, nine, and six pounder, is three hundred yards, and from which to seven hundred yards every quarter degree elevation increases the range one hundred yards; from seven hundred to one thousand every quarter degree, increases it seventy-five yards, and from one thousand to one thousand two hundred yards every quarter degree increases it fifty yards. The *point blank* range of brass twelve, six, and three pounders is two hundred yards, from which to six hundred and one

thousand yards, an increase takes place with every quarter degree of elevation.*

The missiles projected by guns are varied in their character, size, force, effect and denominations. They are generally called *shells*, *carcasses*, *shrapnells*, *common case* or *canister*, *grape shot* and *round shot*.

Shells are hollow spheres of iron with a hole at one part of the ball for the reception of a *fuze* or tube of wood filled with a composition of saltpetre, sulphur and mealed gunpowder, forced with an iron driver into a loaded shell. The *fuze* is of such length as to continue burning while the shell is in its range and to set fire to the powder as soon as it touches the ground, which occasions the shell instantly to burst into many pieces. It follows that the preparation of a fuze requires very great care and conscientiousness, for if the material is not driven into it so as to form a compact or concrete mass, which cannot be re-pulverised by any other action than its ignition within a gun, it would be very liable to explode the shell before the time required, and thus fail of effect and perhaps kill or injure the persons concerned in working the gun. Shell fuzes burn at the rate of one inch in five seconds. Shells themselves are half filled with gunpowder. The broken fragments of the shell and not its contents form the destructive power.

Carcasses are a species of shell, filled with a composition of pulverized saltpetre, sublimated sulphur, pounded resin, pounded antimony, batton and turpentine, the flame from which is extremely powerful and nearly unextinguishable. Carcasses burn from eight to ten minutes, and having three holes are sure to touch some object when they reach their goal.

Shrapnell shells, or spherical-case shot, are shells filled with musket balls, having a bursting charge of powder mixed with them. Their fuse is shorter than the common shell in order that the shell may burst in the air before the comple-

* *Point blank* range is the distance from the muzzle of the gun to the first point at which the shot strikes the ground; it being supposed that the latter is parallel to the axis of the bore. If the gun is pointed at an object, by looking along the upper surface of it through the two sights or elevated notches, it is said to be laid by the line of metal, and it gives the gun an elevation of about one degree, the breech being wider than the muzzle.

tion of its range, scattering the musket balls and the splinters of the shell among a body of troops at a distance of 1,200 yards. These shells were invented by Gen. Shrapnell of the Royal British artillery. He received a pension of £1200 per annum for his invention.

Common case or cannister shot consist of a number of balls packed in tin canisters of a cylindrical form, the balls being of different weights according to the size of the gun. These shot are seldom used at a greater distance than three hundred yards, and even at that range they scatter so much as to be nearly unserviceable; but from one to two hundred yards they are very destructive.

Grape shot are a combination of balls, either put into a thick canvass bag and corded strongly together with a plate at the bottom so as to form a kind of cylinder resembling a bunch of grapes whose diameter is equal to that of the ball which is adapted to the cannon, or they consist of a succession of plates, between every two of which is a tier of balls. They are very effective at a distance of two hundred yards.

Round shot are solid balls of iron of various weights chiefly serviceable against masses of infantry and cavalry and field artillery. They are either used for direct fire or for *ricocheting*, i.e., making several bounds in their course, striking different objects in their flight. In the latter instance they are serviceable in clearing a parapet of its defences, dismounting guns and in throwing a column into confusion. Round shot are capable of being made red hot, and are in that condition used to destroy magazines, buildings, the interior of forts, barracks, shipping, &c. In loading a gun with red-hot shot, a wet wadding is introduced over the dry wad to prevent any possibility of contact with the charge of powder before the command to "fire" is given. If the gun is required for a *plunging* fire, that is, to fire at an object below the muzzle, a second wet wad is introduced and the piece depressed.

There are other descriptions of destructive missiles used with ordnance besides those enumerated above. Such are *smoke balls*—hollow balls filled with corned mealed powder, pulverized saltpetre, sea-coal, Swedish pitch and tallow. They are fired from mortars to suffocate the men in mines, or to prevent them from continuing their work. They are also used to conceal manœuvres, &c., from an enemy. Smoke balls burn from twenty-five to thirty minutes. *Light balls* of saltpetre, sulphur, resin and boiled linseed oil, are like-

wise thrown from mortars at night to discover the operations of the enemy's working parties. They burn from ten to twenty minutes.

Guns are fired from batteries—a term of varied significance, but generally meaning a number of pieces of ordnance placed behind an elevation of earth, or even without such covering, according to the circumstances under which the guns may be used. A *breaching battery*, for instance, is one which may be placed at a certain distance from any wall or rampart in order to demolish it. An *enfilading battery* is one whose front is perpendicular to the protruding line of the enemy's rampart so that the shot from the guns may enfilade the interior side of that rampart or its parapet in the direction of its length. When shot are discharged from a *ricochet*, as above described, the battery is a *ricochetting battery*. A *gun* or *howitzer battery* is one in which guns are only employed temporarily in the field, without breastwork defences, and can be moved about at pleasure from one part of a scene of action to another. A gun is said to be *in battery* when it is unlimbered, that is, separated from the ammunition carriage generally attached to it, and placed in position to do execution upon the enemy. When the battery is mounted on a natural or artificial eminence so as to allow the guns to be pointed downwards to make a *plunging* fire against or into the works of an enemy, it constitutes a *cavalier battery*, and when elevated on a platform or on tall carriages so as to be enabled to fire over the superior surface of the parapet or *épaulement*, it is said to be *en barbette*.

In fine, the term 'battery' refers to "a permanent organization of a certain number of cannon with the men and other accessories required to serve them. *This is the unit of force in this arm.* The regimental organization is a mere nominal arrangement, for in actual service artillery acts by batteries and never by regiments. Its strength is, therefore, invariably estimated by the number of its batteries." A battery, in this interpretation of the word, is composed of six pieces, two of them being howitzers. Each piece is attended by a *caisson* mounted on a separate carriage. The *caisson* is, in the British army, called the ammunition wagon. It follows the gun and limber. Gun limbers carry material for the immediate service of the guns, such as case shot, round shot, cartridges, files, funnels, knives, mallets, setters, needles, pincers, saws, scissors, wor-

sted, portfires, water buckets, lanyards, pickaxes, carbines, bill-hooks, &c. The *caissons* carry shot, shell, cartridges, camp kettles, tent pegs, poles and tents, horse shoes, blankets, and corn sacks.

The artillery is divided into horse and foot brigades, and into light and heavy artillery ; the latter comprehending the pieces used in sieges, and garrison and seacoast fortifications. From eight to ten men are required to *serve* each gun as soon as it gets placed in position. One points (aims) and gives the word of command ; a second sponges the gun and rams home the cartridges ; a third places his thumb on the vent or touch hole of the piece while these operations are going forward to prevent the admission of air and thus ensure the extinction of every spark of ignited powder that may have been left in the gun after its discharge ; a fourth artilleryman fires the piece ; a fifth places the cartridge within the bore ; a sixth brings the cartridges from the limber ; a seventh has charge of the limber ; an eighth takes care of the ammunition wagon, &c., &c.

Artillery is so formidable an arm of warfare that every effort is made to "take the guns," and then to render them temporarily unserviceable by spiking them. Often, however, the possessors of the guns, seeing that they will inevitably fall into the hands of the foe, and be turned against their original owners, will spike them of their own accord. This is immediately done when a fortress or battery is abandoned, always supposing that there is time for the operation. The process of spiking is simple and may be performed quickly. A favorite mode of spiking is by driving a rat-tail file into the vent, and breaking it off. If the spike be an ordinary nail, made of soft iron, the drill will readily remove it ; while the hard steel of the file will require far greater time and labor. The steel spike, rough and jagged, with a soft point is also used. If broken off even with the surface of the gun, and the point clinched inside by the rammer, removal is made more difficult. If the spike happens to be so small as to fit loosely, it may be driven out by gunpowder ; but if it be made of hardened steel, with an accurate fit to the vent, and driven in with great force, neither drill nor powder will remove it. A patent spike was brought out in England during the Crimean war, which claimed to make a gun permanently unserviceable. It consisted of a rod of finely-tempered steel, turned to fit the vent but to move

freely in it, and terminating in a forked spring in the bore of the gun. It was contended that this spike could not be drilled out, because it would turn with the drill. But though this were true, yet its inventor forgot the important fact that the forked points in the bore could be cut off by a single blow on a cold chisel. When a spike is so fixed as to render extraction very difficult, the remedy is to drill a new vent, which may be done without impairing the usefulness of the gun. To do this a competent machinist will require some three hours, or more or less according to the size of the gun. But all spiking at the vent is admitted to be only a temporary expedient to render artillery unserviceable at the moment. Yet even this has often been found productive of the most important results.

When time is afforded, such as the deliberate abandonment of a military work, spiking at the muzzle is sometimes adopted, and when thoroughly done, with far greater embarrassment to those who subsequently come into possession. A shot is driven into the bottom of the bore by wrapping it with felt, or using iron wedges, and employing an iron rammer to drive the ball home. When this is done to an iron gun, the only method of unspiking it is to bore a hole in the breech and drive the ball out, closing the hole with a screw. To do this, the gun, in most cases, must go back to the foundry. In brass guns, which usually have vent-pieces, these can be taken out and the ball expelled by wedges. Various modes for destroying cannon are adopted. Shells are sometimes exploded in them, while heavy charges are put in others, over which sand or shot is rammed to the muzzle, and bursting follows. One piece is sometimes fired against another, muzzle to muzzle, or the muzzle of one to the chase of the other. In iron guns the trunnions are broken off; with brass ones, a fire is lighted under the chase, and when struck with a heavy sledge while heated, the gun is bent and disabled. Had time been allowed Colonel Anderson to destroy the cannon in Fort Moultrie before abandoning it, there can be little doubt, from his long experience as an artillery officer, that he would have left to the rebels a legacy of crippled guns unfit for anything but the foundry.

When guns have been recovered from the enemy, or are captured in a spiked condition, the following methods of unspiking them are recommended by Major Griffiths of the

British Artillery, in his *Artillerist's Manual*, a work of such high repute, that it is, by command of the military authorities, the text book of the army.

If a gun has been spiked with a common steel spike, load with a charge of powder equal to half the shots' weight; lay a leader of quick match along the bore, and double shot the gun, introducing the shot, however, very carefully. By affixing a portion of slow metal to the end of the quick metal, which reaches to the muzzle, the gun may be easily and safely fired. Should the spike not be removed the operation may be repeated.

When brass guns have been spiked, it would be advisable, a day or two before making the above experiment, to scratch round the spike with a graver, and pour a few drops of sulphuric or nitric acid into the circle, which, being repeated, will find its way down between the spike and the metal, particularly if the former is not perfectly round. When the gun cannot be unspiked by the above mentioned operation, make a large fire round the breech to soften the spike, and after the gun has been gradually cooled the spike may generally be removed by using the drill.

When a gun cannot be unspiked, the only means of rendering it serviceable is to drill another vent, about half an inch from the original one.

To drill a new vent will require about an hour per inch. Care must be taken that a very small drill is first used, and afterwards one rather less than the diameter of the vent, otherwise the vent will run the risk of being too much enlarged.

RECONNOISSANCE AND SURVEYING.

It is impossible to over-estimate the value of a careful reconnoissance. No commanding officer is justified in groping in the dark. A hundred instances might be cited in which troops have fallen into an ambush, or been stopped in defiles, or suddenly brought into the presence of a superior enemy, or halted in localities where there was neither wood, nor water, nor grass, to say nothing of the absence of villages, farms, or any other means of supply. "Look before you leap," is a capital adage at all times, and peculiarly susceptible of application when marching in a hostile country.

Reconnoissances are *general* and *special*. *General* if it is to embrace a large tract of country, and for an entire campaign ; *special* if made for collecting detailed information respecting a proposed line of march, the passage of a river, the position of a foe, &c.

In the case of *special* reconnoissance, very great caution is requisite. An officer in command will if possible make this himself accompanied by a strong body of cavalry, but the occasion will frequently arise when the whole survey of the ground in front requires to be surveyed by single individuals disguised. Woe be to them if they be caught—for then the dignified office of a surveyor becomes metamorphosed, by hostile interpretation, into that of a common spy, and the unlucky individual is often rewarded for his zeal by *sus per col*. Wellington, during his five years' campaign in Spain and Portugal, was often obliged, before he advanced or retreated, to make himself well acquainted with the country he had to traverse, for little information on this head had been given by travellers, and the people of the villages were not to be relied upon ; they were too often in the interest of the French. Wellington generally depended on the Officers of the Quarter Master General's Department, and when they were not available, intelligent regimental officers were employed, and their promotion to the Staff was the immediate result of their success. A Colonel Grant was peculiarly fortunate in his reconnoissance. He was a man of great courage and sagacity. Upon one occasion being desirous of counting the number of French batteries in position, he rode as near as possible to the right of the French line. A vidette fired upon him ; he immediately threw his body forward on the neck of his horse, as if wounded or killed, and immediately giving it the spur, rode at a full gallop along the whole line, keeping his left eye above the horse's mane, and counting the corps as he passed along. When he reached the left of the line he turned off towards the British position. A French *chasseur a cheval* on outpost duty, now rode after him to catch, as he thought, the stray horse, but, to his surprise, Grant rose up and wounded him with a shot from his pistol. Upon another occasion, Grant was sent out but was captured by the enemy. Wellington, however, never despaired of his escape and return, for his absence had been frequently prolonged, and sure enough, after the lapse of two years he walked into his Commander's tent, after endur-

ing many hardships, and being exposed to many perils. In India reconnoissances were often made by officers disguised as natives.

For perfect accuracy of reconnoissance certain scientific instruments are necessary. The theodolite or pocket sextant, the prismatic compass, or the reconnoitring protractor, are all valuable adjuncts if their true purpose be understood. But we will suppose a case in which the person employed is without surveying instruments of any kind, excepting perhaps, a telescope and a watch. The latter is of great utility in determining distances, by the flight of sound, and the former in seeing what occurs in the distance. To such an individual, the following hints gathered from the works of Lieut. Colonel Basil Jackson, Major Griffiths, Captain Younghusband, and others, may prove of utility.

A reconnoitring officer should direct his attention to

1. THE PARTICULAR NATURE OF EACH DISTRICT, &c., OF COUNTRY, AND ITS PRODUCTIONS.

Information should be obtained and noted on the following subjects. What parts of the country are mountainous, or hilly, and what are level; whether the hills are steep, broken by rocky ground, rise by gradual and easy slopes, or if the ground undulated only in gentle swells. In what direction the ridges run, and which are their steepest sides. The nature and extent of their valleys, ravines; where they originate, in what direction they run, whether difficult of access, or to be easily passed. Whether the country is barren, or cultivated; whether it is grazed by cattle, by sheep, or by horses, and in what numbers; what parts of the country are open, and what are enclosed, and the description of the enclosures. What parts of the country are wooded, and with what species of trees. What is the nature of the soil. What is the nature of the country, in reference to the operations of troops, what parts of it are favorable for the acting of cavalry, and what for infantry.

2. THE RIVERS, MINOR STREAMS, AND CANALS.

The sources of rivers, and the direction of their course, whether they are rapid or otherwise; their breadth and depth, and what variations they are subject to, at different seasons of the year; the nature of their channels, and of

their banks, whether rocky, gravelly, sandy, or muddy ; of easy, or of difficult access.

Bridges.—The bridges across rivers, whether of stone, or of wood, their breadths and lengths, if accessible to artillery, and capable of bearing its weight. The nature of the fords, if always passable, or at certain times, and seasons only ; whether their situations change : (a ford should not exceed, in depth, three feet for infantry, four feet for cavalry, and two and a half feet for artillery.) What rivers are navigable, and from and to what points, and by what description of vessels, or boats.

Ferries.—Their breadth, and the nature of their landing-place on each side ; what description of boats are used at them, how many men, horses, or carriages, each boat is capable of conveying ; how much time the passage requires, and in what manner it is performed.

Canals.—Their course, breadth and depth ; the nature of the traffic carried on upon them ; the number of the boats usually to be found at different places ; and the nature, and dimensions of the boats, &c., navigated.

Lakes, and Inlets of the Sea.—Their situations, extent and boundaries ; what description of vessels can navigate them, &c., &c.

Marshes.—Their situation and extent, whether passable for troops in any port ; and if they continue throughout the year, or exist only during the wet season.

3. POPULATION, RESOURCES, ACCOMMODATION FOR TROOPS, &c.

The size of towns, and villages, and the number of their inhabitants ; and whether well supplied with provisions or not. The number of houses, churches, or convents, or other public buildings ; whether the houses are large, or small ; what number of troops could be accommodated in private houses, and what in public buildings ; what stabling there is, or other cover for horses ; if the town is walled or open, favourably situated for defence or otherwise ; if capable of being strengthened, and by what means. Plans or sketches of walled towns, defensible villages, or detached buildings, should always accompany the reports upon them. The number of carriages, horses, mules, and draught oxen, in possession of each town, villages, &c., should be stated ; and what mills are in the town, or vicinity, and whether turned

by wind or water ; what number of bakehouses, and quantity of bread they can produce in a given time ; whether the place is very healthy or not ; if it be unhealthy, whether it is so generally, or only at particular seasons.

Roads.—Particular information must be obtained respecting the roads ; in the description of which it is impossible to be too minute. Whether the road is fit for artillery, wheel carriages, cavalry, or for infantry only, over what description of soil it passes, and to what injuries it is liable in bad weather. Whether it is easily repairable or not ; whether materials are to be found in the neighbourhood ; whether any great improvement can be made in the general direction of any part of the road, by adopting a new line, &c.

Particular attention should be paid to the ascents and descents upon the road ; whether they are gradual or abrupt, rugged or stony, having short turns, or other difficulties. The ferries, bridges, fords, &c., met with upon the road, should be particularly described ; the possibility of obstructing or breaking up the road so as to prevent its being used by the enemy, or of destroying the bridges or fords, should be stated. The distances of the places along the road should be given, both in the measures of the country and in English miles. The time required to travel the different distances, (at the ordinary walk of a man, or pace of a horse,) should also be stated. The places to the right or left, near the road, should be mentioned ; their distances from the road, and at what points the communications to them strike off. Whether there are any railroads, and what facilities they offer for the rapid transport of troops, artillery, provisions, &c., &c.

4. CAMPS AND POSITIONS.

All strong passes, or more extensive positions, which present themselves either upon the line of a road, or in any other situation, as also all places favorable for encamping, or bivouacking troops should be particularly described, their situation, extent, facility of access, nature of soil, supply of water at all seasons, quantity and kind of wood, &c.

A sketch of the ground should always accompany these reports. Sketches of positions should never be made upon a smaller scale than four inches to one English mile. More general sketches may be made upon a scale of two inches to a mile, and tracings of roads upon a scale of one inch to a

mile. In all reports, officers should state distinctly what parts of the information they contain rest upon their own personal examination of the objects in question, and what upon the authority of others, and in the latter case, they should mention the source of their information.

MEANS OF ASCERTAINING HEIGHT AND DISTANCES OF VISIBLE OBJECTS.

In the absence of the requisite mathematical instruments, means must be taken to ascertain the height and distance of remote objects by the eye-sight, by sound, by pickets, and by whatever convertible article may be at hand.

By means of pickets.—Take two pickets of unequal length, drive the shortest into the ground, say close to the edge of a river; measure some paces back from it and drive in the other, till you find, by looking over the tops of both, that your sight cuts the opposite bank. Pull up the first picket, measure the same distance from the second in any direction the most horizontal, and drive it as deep in the ground as before. Then, if you look over them again, and observe where the line of sight falls or terminates, you will have the distance required. This method is only applicable to short distances.

By means of the peak (visor) of a cap.—To measure the breadth of a river, place yourself at the edge of one bank and lower the peak of your cap till you find the edge of it cut the other bank; then steady your head by placing your hand under your chin, and turn round gently to some level spot of ground, on your side of the river, and observe where your eyes and the edge of the peak again meet the ground, measure the distance by pacing; which will be nearly the breadth of the river.

By eye-sight.—Good eye-sight recognizes masses of troops at one thousand seven hundred yards; beyond this distance the glitter of arms may be observed. At one thousand three hundred yards infantry may be distinguished from cavalry and the movement of troops may be seen; the horses of cavalry are not, however, quite distinct, but that the men are on horseback is quite clear. A single individual detached from the rest of the corps may be seen at one thousand

yards, but his head does not appear as a round ball, until he has approached up to seven hundred yards; at which distance *white belts*, and *white trousers* may be seen. At five hundred yards the face may be observed as a light coloured spot; the head, body, arms and their movement, as well as the uniform, and the fire locks (when bright barrels) can be made out. At between two hundred and two hundred and fifty yards all parts of the body are clearly visible, the details of the uniform are tolerably apparent *and the officers may be distinguished from the men.*

By sound.—The movement communicated to the particles of air by the vibrations of a sonorous body is the cause of the sensation of sound; and it is because the particles are drawn from the point of vibration in every direction, as from a centre, that the sound is perceived at once, every where within the surface of a sphere of certain extent. From various experiments made with great care by Dr. O'Gregory, it has been found that sound flies through the air uniformly at the rate of about one thousand one hundred feet per second, when the air is quiescent and at a medium temperature. At the temperature of freezing or a little below, the velocity is about one thousand one hundred and twenty. The approximate velocities under different temperatures may be found by adding one thousand one hundred and half a foot to every degree on Fahrenheit's thermometer above the freezing point. We mean velocity may be taken at three hundred and seventy yards per second, or a mile in four and seven ninth seconds. Hence, multiplying any time employed by sound in moving by three hundred and seventy, will give the corresponding space in yards, or dividing any space in yards by three hundred and seventy will give the time which sound will occupy in passing uniformly over that space. If the wind blow briskly, or at the rate of twenty to sixty feet per second, in the direction in which the sound moves, the velocity of the sound will be proportionally augmented; if the direction of the wind is opposed to that of the sound, the difference of their velocities must be employed. The velocity of sound is not affected by its intensity, the smallest sound moving as rapidly as the loudest.

By the report of fire arms.—Multiply the number of seconds which elapse between the time of seeing the flash, and hear-

ing the report by one thousand one hundred, and the product will be the distance in full, with sufficient accuracy for ordinary purposes. If greater accuracy be required, this rule must be modified, on account of the velocity, and direction of the wind and state of the thermometer.

Sound will be louder in proportion to the condensation of the air. *Water is one of the greatest conductors of sound* : it can be heard on water nearly twice as far as upon land.

The sounds which are most commonly heard by reconnoitring parties in the vicinity of farms, villages, woods, camps, barracks, factories, &c., are the crowing of cocks, the clink of the blacksmith's hammer, the ringing of bells, the splashing of water mills, the murmur of water falls, the beat of drums, the blast of trumpets, the stroke of the woodcutter against a tree, the operation of sawyers, the call of herdsmen, the lowing of cows, the bleating of sheep, the neighing of horses, the barking of dogs, the shot of the fowler, &c.

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GLOSSARY

OF

MILITARY TERMS.

Abattis.—Young trees, about eighteen feet in length, stripped of their leaves, and pointed at the ends of their branches. Used as defences, and generally placed in front of a line of entrenchments.

Artillery.—Every description of armament, but more generally applied to the great guns of an army, and all pertaining to them.

Banquette.—The stand-point of the soldiery in rear of the parapet, whence they deliver their fire upon the enemy in front.

Barbette.—When a gun is placed on a platform so that it can be fired over the parapet, it is called a gun *en barbette*. This mode of placing defensive artillery in a fortress, enables the gunners to point it in any direction; but it has the disadvantage of being more exposed to the enemy.

Bastion.—A part of a fortress consisting of faces and flanks, so disposed that every part of the adjoining work can be seen into.

Battalion.—Ten companies of infantry of the ordinary regimental strength. Regiments usually consist of one battalion, but in time of war they are often augmented to two. The British Guards and Rifle Brigade consist each of three battalions.

Battery.—This term is applied indifferently to six movable guns, more or less, with their complement of men, officers, and horses, and to guns stationery, protected by earth works.

Berm.—A level pathway running in front of a parapet at the base of the exterior slope. Its purpose is to receive the earth that may be shot away by an enemy's artillery, and prevent its falling into the ditch.

Bivouac.—Literally "the watch." It applies to a halt in the open air, beneath trees, or in a plain without the protection of tents.

Bomb-shell.—A shell projected from a mortar or bomb.

Bombardier.—The lowest non-commissioned rank in the British army.

Breach.—An aperture, of considerable width, made in the walls of a fortress, to facilitate its being stormed. When an engineer reports to the officer commanding at the siege of a fortification that a breach is "practicable," he means that either by a constant fire of artillery or certain mining operations, the way is open for the assault.

Breech.—The part of a gun in which the charge is deposited communicating with the vent, lock, or detonating primer.

Brigade.—Three or more regiments of infantry or cavalry, or three batteries of artillery, associated together.

Bull's Eye.—The circular spot in the centre of a target.

Caisson.—A box attached to a gun carriage for the conveyance of ammunition, tools, &c., that may be immediately required.

Cannon.—The guns used by the artillery. The word is derived from the Italian, and means a *cane* or *reed*, which, in shape, the guns originally resembled.

Caponnier.—A covered passage running across a ditch, and connecting the walls of a fortress with the outer works.

Carronade.—Small pieces of artillery supported on swivels.

Casemate.—Bomb proof works within a fortress, and used as barracks, magazines, store-rooms, &c.

Chevaux de Frieze.—A cylindrical pole, from around which project spiked bars, presenting a barrier to an attacking enemy. Used with great effect by the French when the walls of Badajoz had been breached by the British.

Counterscarp.—The side of a ditch facing the walls of a fort.

Command.—The height from the crest or top of a parapet to the bottom of the ditch. The term is likewise applied to the position of an officer at the head of a body of troops.

Cohorn.—A small mortar.

Congreves.—Formidable rockets, invented by a General Congreve, in the reign of George III.

Cornet.—The lowest commissioned rank in the cavalry.

Cremaille.—Literally "a flesh hook"—applied by the French to a description of entrenchment with a long face and short flank. Called by the English "indented lines."

Crochet.—A narrow passage running round the counterscarp of a fortress.

Curtain.—A straight wall in a fortress connecting two bastions.

Dahlgren.—The name given to an American gun, after its inventor, a captain in the navy.

Deblai.—The excavation caused by forming a ditch around a work of any kind.

- Ditch*.—Or fosse—an excavation formed in front of any work, for the double purpose of presenting an obstacle to attack, and providing the earth for the construction of the parapet.
- Embrasure*.—An opening in a rampart for the reception of a gun, narrow at the back that the gunner may not be exposed to the fire of the enemy, and widening in front to afford scope for the explosion of the powder.
- Enfilade*.—To sweep, by fire, the sides of a force or fortress.
- Entrenchment*.—Ditches, parapets and field works of every kind, constructed to protect a camp or position.
- Epaulement*.—A mound of earth raised to protect the horses of an army, or to bound a chain of works which have no natural flank or termination of a defensive character.
- Escalade*.—An attack of a fort by scaling ladders.
- Escarp*.—The inner side of a ditch, sloped or “scarped,” that it may sustain the parapet.
- Exterior slope*.—The outer portion of a parapet sloping to the ground.
- Face*.—*v. a.*—To turn to the right, left, rear or front. *Noun*—the sides of a bastion looking towards the country.
- Facings*.—The cuffs and collars of a soldier's coat.
- Fascine*.—A bundle of twigs or brush wood of various lengths, answering various purposes. In the absence of solid earth, fascines are used in the formation of parapets, batteries, &c. They are also carried by the soldiery attacking a fortress to fill up a ditch and facilitate a passage across.
- Flank*.—The sides of a regiment or army, or that part of any fortification which commands and protects the faces and curtains.
- Flute*.—A small outwork in the shape of an arrow head—differing from a redan in that it has no ditch.
- Fosse*.—The French term for the ditch of a fortress.
- Fougasse*.—A small mine, formed usually of a box half full of gunpowder, covered with stones, and inserted beneath the counterscarp of a ditch.
- Fraise*.—A palisade driven into a counterscarp in a sloping form, and intended to prevent scaling ladders being placed in the ditch.
- Fuze*.—A small tube (filled with combustible composition) placed in a shell, lighted from without, and carrying fire into the interior to cause the explosion of the shell at any given moment.
- Gabion*.—A cylindrical basket, open at the top and the bottom, and filled with loose earth. When firm earth cannot be obtained for the construction of batteries, entrenchments, &c., recourse is usually had to gabions.
- Glacis*.—The parapet in front of the counterscarp of a work sloped gradually down to the terre plein.

- Gorge.**—The inner part or open space of an angular work.
- Grenade.**—An iron ball of the size of a pomegranate, whence it derives its name, charged with powder and ignited by a fuze communicating with the interior. It is used by soldiery in the attack of a fortress to clear the parapet.
- Grenadier.**—A name derived from the duty assigned to the front company, in an assault upon a fortress, of clearing the way with hand grenades.
- Grape-shot.**—A collection of small solid shot made up in a bag, and held together by wire-work, giving them the appearance of a bunch of grapes. When the shot strike the object at which they are levelled, they scatter and inflict great damage.
- Gunner.**—A private in the artillery.
- Horn-works.**—A detailed work consisting of two inner faces, reciprocally defending each other, and resembling, in their horizontal development, a pair of horns.
- Howitzer.**—A field gun, generally a twelve-pounder, whence shells can be fired.
- Inner, or Interior Slope.**—The portion of earth sloping from the crest of a parapet to the banquette, and intended to protect the earth from falling.
- Lance-corporal.**—A non-commissioned officer who wears one stripe or cherion, and has no extra pay. It is an honorary or probationary rank.
- Lunette.**—An outwork, generally placed in front of a curtain, or detached to defend avenues, bridges, farm houses, &c.
- Lunge.**—The thrust made in the bayonet drill, accompanied by a corresponding forward movement of the left leg.
- Mortar.**—A short, thick, formidable description of ordnance—placed at an angle of forty-five degrees—used for throwing shells vertically into magazines, store-houses, and the interior of fortifications.
- Palisade.**—A stake driven into either of the scarps of a fortress as an obstacle to an attacking party.
- Parallel.**—A trench dug around a fortified place, at a distance of six to twelve hundred yards, as a base of siege operations. There are usually three parallels, each nearer by four hundred yards to the place besieged, and approached by zig-zags.
- Parapet.**—From the Italian words *para* and *petta*—a protection for the breast—implies a breastwork of any kind.
- Point.**—To direct the aim of a gun.
- Profile.**—The side view of the works of a fortress.
- Ramp.**—A slope of earth connecting the banquette of a parapet with the terre plein.

Ramparts.—The whole of the innermost part of a fortification, between the parapet and the extremity of the ramp.

Redan.—An outwork sloped like a triangle, and adapted to the defence of an avenue, a broad road, a bridge, &c. Redans are single and double.

Redoubt.—A small fortress usually placed on a slight commanding eminence, or at the approach to a fortified town.

Reinforce.—A part of the tube of a piece of artillery. Verb active—to supply additional strength to an isolated army or position.

Relief.—The distance from the crest of a parapet to the terre plein. Also the change in a guard, and in the positions of regiments garrisoning certain towns; likewise the raising a siege and obtaining freedom for the beleaguered defenders. The "Relief of Lucknow" is one of the finest incidents on record.

Remblai.—The earth excavated from the ditch of a fortress for conversion to a rampart.

Saucisson.—A hose, no thicker than a sausage, (whence its name) used as a train for the ignition of the powder in mines.

Shell.—A hollow iron sphere, partially filled with gunpowder, and projected from a big gun, howitzer or mortar. A fuze, ignited at the moment of the discharge of the piece, conveys fire to the interior of the shell and causes explosion. A fragment of a shell thus burst will inflict a severe wound and very frequently death.

Spherical-case.—Implies a round hollow shot, filled with combustibles.

Spikes.—Pieces of steel, four inches in length, employed to fill up the vent of a gun, and render it temporarily unserviceable.

Stockades.—A collection of wooden logs placed upright, with slight intervals, for the purpose of firing through. Stockades make good impromptu walls; but they cannot withstand the crushing fire of modern artillery.

Tactics.—The science of movements in the field.

Tamp.—To entwine and press down the turf and earth removed from the ditch, for the construction of strong parapets.

Target.—A square frame of straw, covered with canvass, and painted in circles, as a mark for rifle practice.

Tenaille.—An outwork in shape of an open pair of pincers; usually placed in front of the curtains of a fortress.

Terre plein.—The level ground on which a fortress or other work is raised.

Tete de pont.—Or bridge head. A work, or series of detached works, so disposed as to protect an army, while passing across a ravine, from the attack of a pursuing enemy.

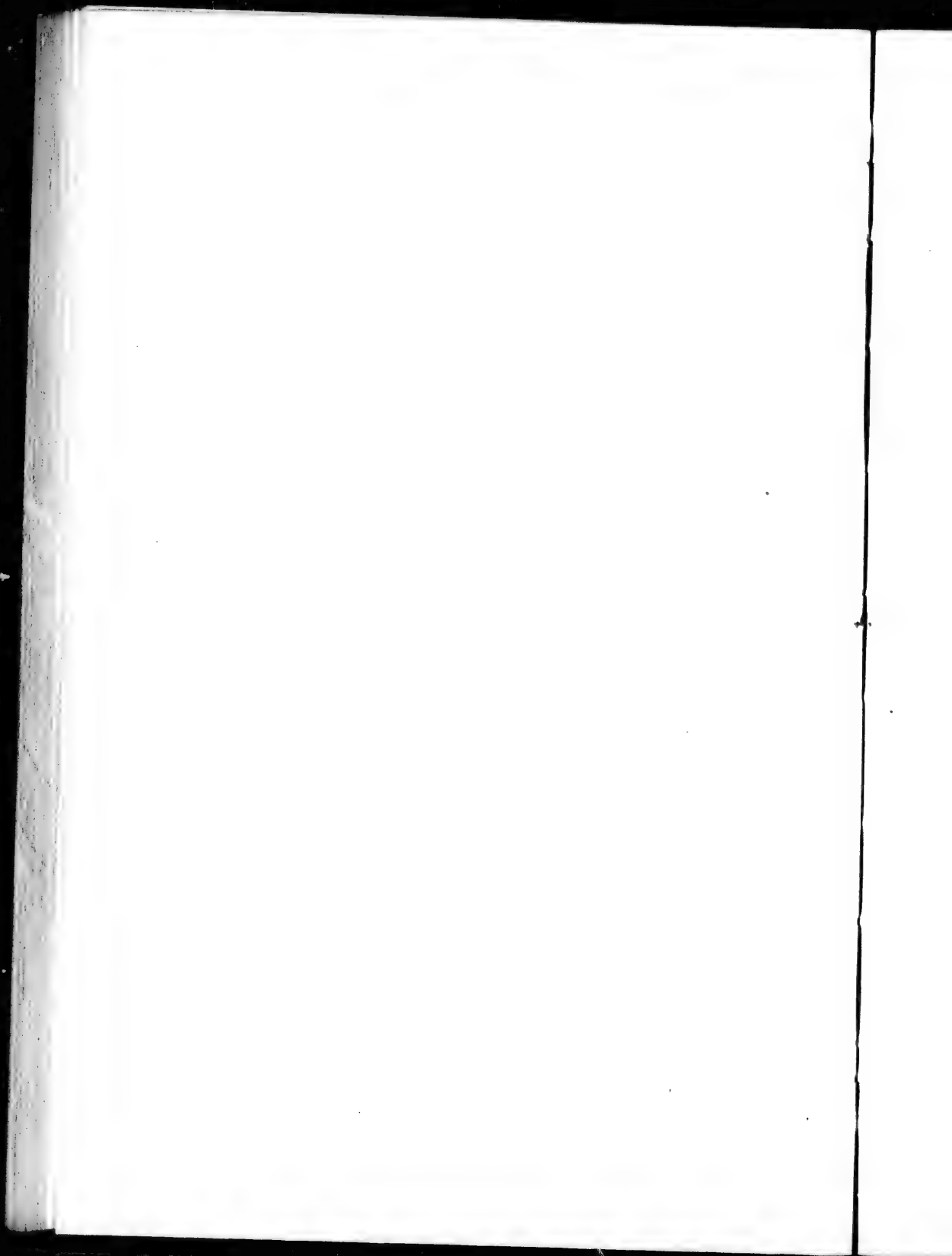
Trajectory.—The flight of a bullet on its travel from the muzzle of a rifle.

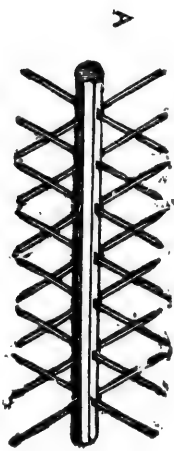
Traverse.—An earth work, in form of a parapet, so disposed across the passages of a fortress, or near its entrance, that it can receive the splinters of bursting shells, and enable a garrison to dispute every inch of the ground with the assailing party

Trous de loup—Or wolf holes—a pit seven feet deep, shaped like an inverted cone, having a sharpened stake rising from the centre. These holes are usually dug around a fortress beyond the *abattis*, and form powerful and dangerous obstacles to the enemy.

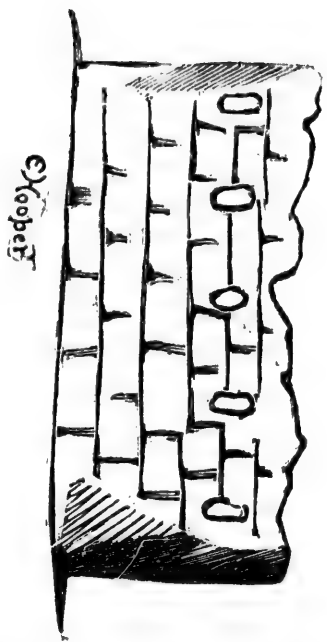
Volt—The spring made by the Zouave in his bayonet exercise to face an enemy who may attack him in the rear, or at one of his sides.





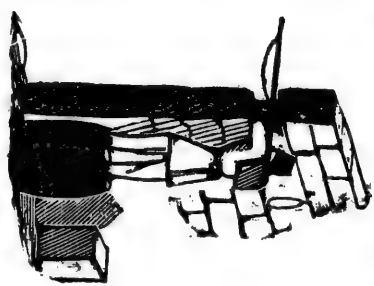


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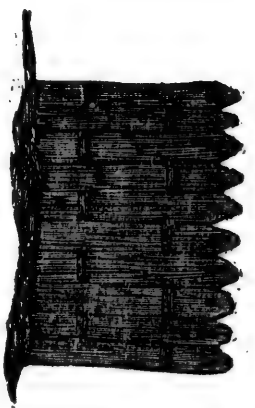
C

Crenellated or Loopholed Wall.



Profile of Wall.

(A) Chevaux de Frieze.—(See page 44.)



Stockade.



The



(B)



The Tree.



The impromptu Parapet.

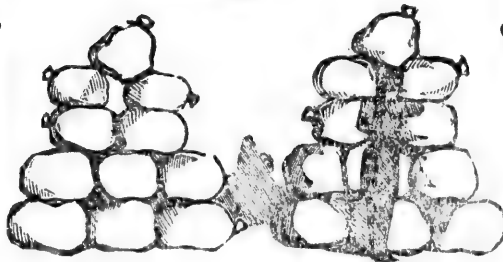


The Log.



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(B) Gabion.



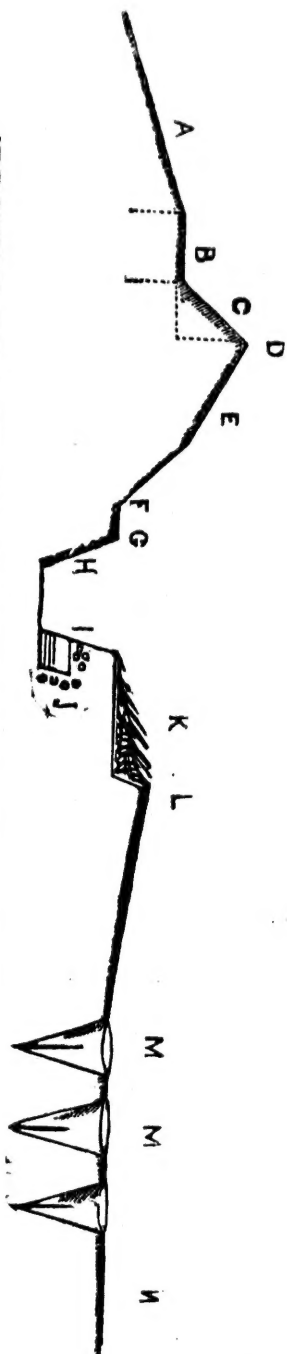
(A) Sandbag.



(C) Fascine.

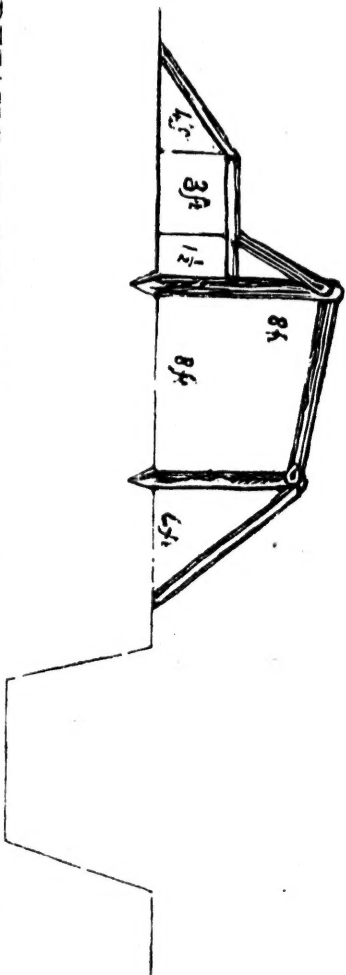
DETAILS OF CONSTRUCTION OF PARAPET.—(See page 43.)

Framework, 8ft. high, and 23½ft. from one extremity to the other—to guide the engineers in placing the earth removed from the ditch.



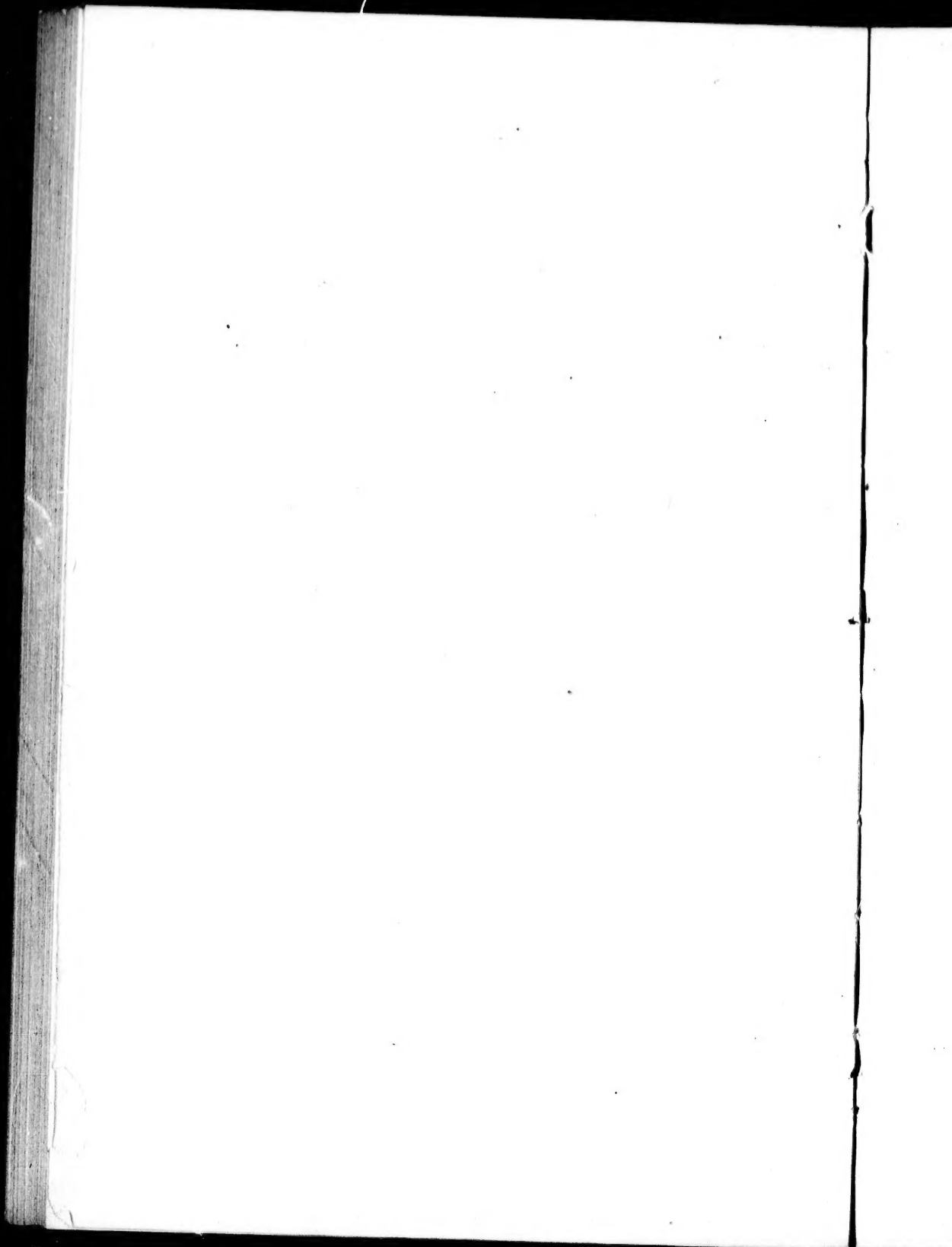
PROFILE OF A FIELD PARAPET AND OBSTACLES.—(See page 43.)

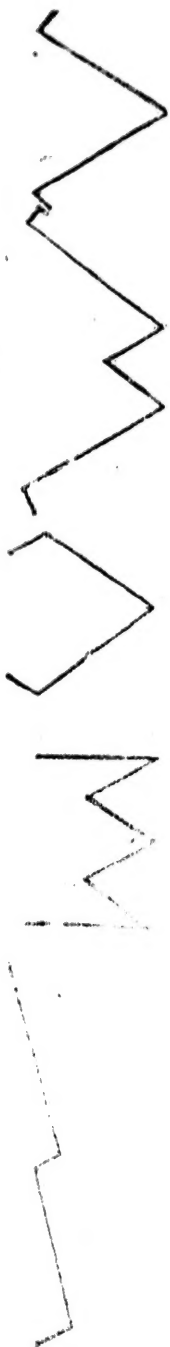
A. The Ramp. B. The Banquette. C. The Inner Slope. D. Crest of Parapet. E to F. Superior Slope. F to G. Bern. H. Escarp of Ditch. I. Counterscarp. J. Fougasse. K. Abatis. L. The Glacis. M. Trous de Loup. N. Terre plain.



DETAILS OF CONSTRUCTION OF PARAPET.—(See page 43.)

Framework, 8ft. high, and 22 1/2 ft. from one extremity to the other—to guide the engineers in placing the earth removed from the ditch.





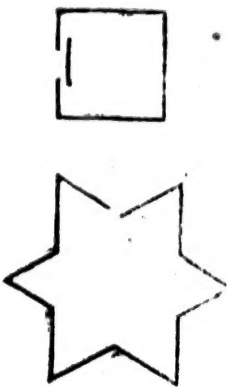
Bedau.

Double Bedau or
Horn Work.

Lunette.

Crown Work.

Indented Lines or Cremailles



Square Redoubt.

Star Fort.

Bastions and Curtain.



Tête de Pont or Bridge Defences